Rebuilding Common Property Management

A case study of Community-Based Natural Resource Management in rural Guizhou, China

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To Pidong and Junyi

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Acronyms and abbreviations

ARD	Associates for International Resources and Development
CBNRM	Community-based Natural Resource Management
CCTV	Chinese Central Television
CIIFAO	Cornell International Institute for Food, Agriculture and Development
DFID	Development for International Development
GAAS	Guizhou Academy of Agricultural Sciences
GDP	Gross Domestic Product
GZGOV	Guizhou Provincial Government
HAPC	Higher Agricultural Producers' Cooperatives
HCRS	Household Contract Responsibility System
IDRC	International Development Research Centre
IIRR	International Institute of Rural Reconstruction
IRC	International Water and Sanitation Centre
IUCN	The World Conservation Union
LAPC	Lower Agricultural Producers' Cooperatives
MAT	Mutual Aid Team
MEA	Millennium Ecosystem Assessment
NGO	Non-governmental Organization
NRM	Natural Resource Management
NRMP	National Resource Management Plan
OECD	Organization for Economic Co-operation and Development
PRA	Participatory Rural Appraisal
PM&E	Participatory Monitoring and Evaluation
RAISE	Rural and Agricultural Incomes with a Sustainable Environment
RMB	Renminbi, Chinese currency
SEPA	State Environmental Protection Administration
SFB	State Forestry Bureau
SLIM	Social Learning for Integrated Management
SPSS	Statistical Package for the Social Sciences
SRL	Sustainable Rural Livelihood
SWOT	Strength, Weakness, Opportunity and Threat
UNEP	United Nations Environment Programme
WWF	World Wild Life

1 Introduction: exploring a new research approach in a rapidly changing country

1.1 Changing natural resource management regimes

Since the late 1970s, China has been undergoing rapid economic transformation from a centrally planned economy to a market-oriented one. The economic reform started with the agricultural sector and was characterized by changes in rural political structure and natural resource management regimes. As a result of the economic reforms, the People's Communes, brigades, and production teams were replaced by townships or towns, administrative villages and natural villages, respectively. The commune regime in rural China collapsed during the years 1980-1982, and was replaced by the Household Contract Responsibility System (HCRS).

Under the commune regime, farmers were organized to work collectively on arable lands and to manage water resources, forests and grasslands according to commune instructions. In turn, the commune received production orders from the Central Government. The State kept a tight control of natural resource use and management through its centrally planned economic system. Under the HCRS, the property rights of the natural resources, including arable land, forest, grassland, wetland and water resources are identified as state-owned or as collectively owned. The HCRS vests collective ownership in the natural village, but the use rights are contracted to individual farmer household. Through this contract or lease system, the use rights of collectively owned natural resources are privatized to rural farmers. This change in management regime has shaped farmers' behaviours and practice in the management of arable land, grassland, forest and water resources. The introduction of HCRS led to a sharp increase in productivity of arable land (Lin, 1992; McMillan, et al., 1989), but also to the dramatic degradation of forests (Cook & Mallee, 2004; Ho, 2005; Zhang & Kant, 2005) and grasslands (Banks, 2003; Ho, 1996, 1998, 2005; Jiang, 2005, 2006), and seriously damaged irrigation systems (Hu, 1997). Some of the resources became open access resources - managed by no one and used by everyone.

The results of these changes in terms of natural resources management were immediately visible at the local level. However, effective management mechanisms for sustainable natural resource management did not emerge overnight. Even though the government made efforts to clarify the property rights and boundaries of natural resource access and tenure, the revised relevant laws such as the Forestry Law (enacted in 1984 and revised in 1998), the Grassland Law (enacted in 1985 and revised in 2002), and the Water Law (enacted in 1988, revised in 2002) stated that the natural resources, including arable lands, forests and grasslands, are the collective property of the local communities. Rural households continued to have little sense of ownership. They had few or no incentives to develop (new) collective actions to

manage the natural resources, although they understood that they could benefit from new forms of collective management.
The collapse of the communal system was very sudden and no new management mechanisms were designed to fill in the gap. It also proved difficult to revive the traditional community management systems and practices that existed before the commune regime (with the exception of a few remote rural ethnic communities whose livelihoods had not been affected that strongly). At the same time, new 'external' influences and powers -markets, government policies and development interventions- were beginning to exercise a very strong influence.
To address the issues of resource degradation and biodiversity loss, the Chinese government has developed some strategies: (1) revising the laws and developing natural resource protection regulations, such as setting quotas for cutting wood; (2) initiating resource protection programs, such as establishing natural reserves and national parks, reforestation programs, and watershed management programs. However, these strategies are not achieving the desired results. Reasons are the lack of manpower to enforce the laws and state regulations, and the resource protection programs not being community-focused and people-centred (Li, et al., 1999; Pomeroy, 1995). Although the promoted strategies are well-intentioned, their implementation is inadequate and does not resolve the problem of resource degradation.

1.2 The central government's recent efforts to achieve sustainable development

Sustainable development is not a new term in China at all. For decades, it has often appeared in government documents. However, the term has become more meaningful since 1998, when China was hit by a historical flood that left over 4,150 people dead and led to 25.5 billion RBM direct economic losses (The Ministry of Water Resources, 1999). Since then, environmental issues, at the core of sustainable development, have become a major concern of the Chinese government. The central government has initiated a range of environment protection policies and programs, such as the Natural Forest Protection Program, which commenced in 1998 and introduced a ban on industrial logging in natural forest regions throughout most of China (Liu, 2006). In June 1999, the government launched the Western Region Development Strategy as one of its major efforts towards to sustainable development. This strategy has two objectives: (1) to reduce economic disparities between the western and other regions; and (2) to ensure sustainable natural resource management. In 2000, the National Land Conversion Program was initiated for the western region in order to reverse the degradation of vegetation and soil erosion by converting steep lands that are presently cultivated or barren, into forest, shrub or grassland through providing a mixture of food and cash subsidies over a period of eight years (Liu, 2006). In the government's 2007 Working Report

(that Premier Wen Jiabao delivered on The Fifth Session of the Tenth National People's Congress on March 5, 2007), it stated that:

> "We need to strongly advocate conservation-oriented, environmentally friendly and civilized patterns of production and consumption throughout society so that conserving resources and protecting the environment become second nature for every enterprise, village, organization and individual member of society. We need to work hard to build a resource-conserving and environmentally friendly society."

In recent decades, the Chinese government has made great efforts to fight rural poverty and improve the lives of rural people, especially in the underdeveloped regions of China. China's ecological crises are particularly severe in its western region where rural poverty, ecological fragility and economic underdevelopment are interwoven (Wu, 2003). The government's 'Three Rural Issues' policy [1] heavily emphasized helping the rural poor and relieving the wealth gap for building a 'harmonious socialist society' and balancing development between rural and urban areas. In 2007, the government rescinded the agricultural tax and taxes on special agricultural products, thereby relieving the financial burden on farmers by about 125 billion RMB each year (Government's Working Report, 2007). According to this Working Report (2007), the central government budgetary spending on agriculture, rural areas and farmers reached 339.7 billion RMB in 2006, covering such items as direct subsides to farmers for purchasing seeds, agricultural machinery and tools, increased transfer payments to counties and townships with financial difficulties and major grain-producing counties, developing rural infrastructure, including roads, water conservancy, electricity, and communication and safe drinking water. All those measures have contributed to lift 2.17 million rural people out of poverty.
In recent times, there has been a shift from an emphasis on economic development to balanced and people-centred development. In the government report of 2007, it stated that "...We must put people first, promote faster progress in social programs, work energetically to solve the most practical problems that are of greatest concern to the people and most directly affect their interests, safeguard social fairness and justice, and ensure that all of the people share in the fruits of reform and development."

1 The Three Rural Issues, or San Nong in Chinese refer to three issues relating to rural development in China. Specifically, these issues are agriculture, rural areas and peasants. At the 2006 and 2007 National People's Congresses, the Three Rural Issues were emphasized throughout Premier Wen Jiabao's speeches on the work of the government in 2005 and 2006 and in the plans of the government for the years 2006 and 2007.

1.3 Exploring new natural resource management approaches

In the early 1990s, Chinese researchers started to practice bottom-up approaches to address resource degradation issues, introducing community-based natural resource management (CBNRM) in forest (know as social forestry), grasslands (known as participatory grassland management) and water resources (for example, water users associations). The core of the approach is community institutional building for self-governance of natural resources (Chen, 2000; Xu, 2003). A research team from the Guizhou Academy of Agricultural Science (GAAS) has been testing these approaches in Southwest China since 1995.

It has been observed that both centrally controlled management and fully privatised management of natural resources are not successful (Chakraborty, 2001; Ostrom, 1990, 1992; Uphoff, 1998). For centrally controlled management systems, the State lacks sufficient manpower and resources to manage natural resources. These systems are usually very costly. The problem with fully privatized management systems is that especially small (poor) farmers are exposed to more or greater risks. CBNRM provides an alternative approach to address natural resource management. Local institution building for collective action for resource management is a major theme in a CBNRM approach. This means supporting the (formal and informal) organization of farmers, and empowerment with improved capacities and a supportive institutional environment. Based on these ideas, the mentioned GAAS team formulated three main hypotheses to guide their research: (1) local institutions are essential for sustainable natural resource management; (2) capacity building of farmers is the base for institutional development; and (3) a supportive institutional environment for collective action by local communities is the key for the sustainability of community-based institutions.

In 1995, with the support of the International Development Research Centre of Canada, (IDRC), the GAAS team implemented a CBNRM project in Kaizuo township, Changshun county in Guizhou province. Guizhou is one of the poorest provinces in China and about half its population belongs to ethnic minority groups. These groups mainly inhabit the mountainous rural areas where they manage complex production systems consisting of irrigated and rainfed rice fields, less-productive uplands, forested areas and grasslands or so-called 'wastelands'. Problems that people face, include low yields, little crop diversification, forests that in general are not in good health, and overgrazed common grasslands (Chen, 2000).

In Phase I (1995-1998), the project involved two communities. The interventions focused on facilitation of community-based institution building, helping to clarify clear use rights of the resources, setting up management groups, and making rules and regulations based on customary norms. The local people were mobilised to take collective action. They contributed their time, labour and money; they took responsibility to manage common-pool resources such as forest, grassland and water systems, village roads, and a village development fund. The approach involved building community-based platforms for negotiating, agreeing on, monitoring, and reinfor-

cing rules for regulating access and sustainable use of natural resources, much along the lines of the Common Property Resource management regimes investigated by Elinor Ostrom and her colleagues (Ostrom, 1990, 1992). In Phase II (1998-2001), the project targeted six communities (including the two that took part in Phase I) to test and validate the experiences generated in Phase I. Community-based institutions were developed in the new four communities and were enhanced in the initial two communities through capacity building.

From the end of 2001, the GAAS team has been trying to scale up CBNRM in Guizhou Province. The GAAS team facilitates four line ministries of Changshun county to adopt the CBNRM and a community-based institution development approach in government projects in more than fifteen communities of Kaizuo township, including the two communities included in Phase I and II. The project activities concern reforestation (by the Forestry Bureau), potable water system construction and management (Bureau of Water Management), hillside terracing for fruit tree planting (Agriculture Office), and cattle raising (Bureau of Animal Husbandry). It is assumed that in the scaling up processes, partnerships among farmers, researchers and government officials at township and county levels will be developed and capacity for implementing CBNRM will be improved.

1.4 A focus on local institutional development

Despite the important role community-based institutions play in sustainable resource management, they face vulnerability. The sustainability and good performance of local institutions are challenged by both internal and external conditions and factors. Common-pool resource management has been extensively studied since the publication of 'The Tragedy of the Commons' by Hardin in 1968. Many empirical studies have shown that common property institutions have positive effects on collective actions for sustainable resource use (Chakraborty, 2001; Ostrom, 1992; Wade, 1987, 1988, Oakerson, 1992). The common-pool resource theorists have generalized the conditions and design principles for successful local institutions for sustainable resource management (Ostrom, 1990, 1992). These conditions include (1) restriction of the group with access to the resource, (2) communication among its members, (3) agreed rules of access to the resource, and (4) agreed monitoring of use and sanctions of misuse. However, these conditions and the design principles are mostly focused on the internal factors, namely the community and the resource.

The linkages between the local management institutions and the external world are absent in the list of enabling conditions and design principles (Steins, 1999; Steins & Edwards, 1999). Institutions are the result of a long historical process of social construction (Santamaria, 2003). It is no doubt that local institutions do interact with the external world, and are affected and shaped by external forces such as market, new technologies in resource use, research institutes, NGOs and government policies and development interventions (Berke, 2002; Young, 2002). In many coun-

tries, the absence of proper policies for governing common-pool resources has put the government against the communities (Moorehead, 1991).

It is not clear which features of the social context most powerfully affect institutional performance, and in what way. Therefore, the conditions and principles defined by the studies referred to are not sufficient to explain the success and failure of local institutions for sustainable common resource management (Agrawal, 2002; Steins & Edwards, 1999). Experience shows that similar institutional innovations or reforms may have different outcomes (Khanal, 2003; Putnam, 1994). It has been argued that 'the enforcement mechanism, the way enforcement occurs, the norms of behaviour, and the subjective models of the actors will be context-specific' (Santamaria, 2003).

In China's context, the national economy experienced dramatic change from central-planning to a market-orientation in the past 25 years. But the political decision-making still follows a top-down approach. The government has a strong influence on community management institutions through its policies and interventions. Local government officials and workers see local communities as the drivers of resource damage. They do not trust local communities to manage natural resource well. When implementing programs they ignore the local interests and local management system, which causes tensions between farmers and the government officials and weakens the community management institutions (Jing, 2000; Liu, et al., 2004; Ren, et al., 2004). Some researchers and NGOs have advocated that local interests be addressed in government programs and that the value of local management systems is recognized by government officials. The mentioned GAAS team is among these researchers. The team has been trying to adapt CBNRM to the Chinese context, scale up CBNRM in China, link local resource management practice with policy making, and bring different stakeholders (local communities, township government, different line ministries of county and provincial government) together to support and improve CBNRM. They argue that partnership building among stakeholders is key in enhancing community-based institutions. The GAAS team is facilitating this partnership development.

The local institutions that govern natural resources are embedded in the socio-cultural and political context in which they are playing their roles. In order for community-based institutions to play a more active role in rural China for sound natural resource management, it is important to analyze how the internal and external/contextual factors and their interfaces influence these local institutions, and to explore ways and means through which effective partnership among local community, government, and other stakeholders could be developed to support and strengthen them.

1.5 Objectives of this study

This study aims to understand whether and how a CBNRM approach contributes to

sustainable natural resource management and improved livelihoods for the rural poor. More specifically, this study aims to explore the issues of how CBNRM works in rural China and why, what the outcomes are and why; to identify the strengths, weaknesses, opportunities and threats of CBNRM in a country such as China with its rapid economic development and socio-political transformation.

Specifically this study aims:

(1) To investigate how the shifts in resource management regime affected the way local people have managed natural resources over the last 50 years;
(2) To analyze the interests of the different stakeholders and the dynamics of their relationships as they pursue their stake-holding in natural resources;
(3) To analysed the effects of the GAAS team's CBNRM action research and facilitation efforts on community institutional development and partnership building among stakeholders;
(4) To assess evidence for the performance of (new) community institutions for common-pool resources management and improvements in the lives of farmers;
(5) To explore the GAAS team's efforts to scale up CBNRM to the government system and to a larger area.

1.6 The GAAS-led CBNRM research project and my PhD research

In this section, I briefly discuss the relationship of and distinction between the GAAS-CBNRM research project and my own PhD research. It is necessary to do so at the very beginning of this thesis, because these two research efforts are interrelated, but have different in objectives, methodology, and outcomes.

The GAAS-CBNRM research project

The GAAS team has implemented a CBNRM project for more than 10 years (1995-present). The overall objective is to study and support CBNRM systems in selected villages in Guizhou province in order to realize sustainable rural development goals and to enable local families and communities to achieve improved food security conditions, enhance their family welfare and income positions, steadily alleviate poverty in the study area and have local farmers' lives on the path becoming better off (The GAAS team, 1995a, 1998, 2001b, 2004). Specifically, the project aims to experiment with farmers and government officials on what makes CBNRM work, generate important principles and elements of CBNRM in China's context and identify effective scaling up CBNRM strategies in Guizhou and beyond (ibid).

From the objectives, we can see that the CBNRM project is an action oriented research initiative, or simply called action research, centred on the learning-by-doing principle (see the left column in Table 1.1). The learning process normally follows

the iterative circle of: diagnosis - planning - implantation or action - reflection - diagnosis (O' Brien, 2001). I discuss action research in more details in Chapter 2. Involving stakeholders in this learning process is a key principle of CBNRM, including farmers, government officials, and business people, etc. CBNRM practice is thus a collective learning process, also called social learning.

The PhD research

My PhD research is closely related to the GAAS-CBNRM project in many ways. I used the GAAS-CBNRM project as my research subject. The general objective of my PhD study is to understand how CBNRM was understood, translated and practised on the ground in rural Guizhou, and what and how CBNRM action research contributed to sustainable natural resource management and livelihood improvement of local farmer households. But I play two roles in the GAAS-CBNRM project and the PhD research. On the one hand, I have been involved in the GAAS-CBNRM project since its start in 1995, and became the team leader in 2001 (during the so-called 'Scaling-up Phase I and II'). In this sense, I am a key implementer of the project. On the other hand, I am the PhD researcher who studies what and how the project was implemented and what effects the project had on the natural resource base and people's livelihoods. My double role made my PhD research easier in some ways, but more difficult in other ways. Using the terms from anthropology, one could say that my role in the GAAS-CBNRM action research is being a development anthropologist, whereas my role in the PhD research is more like being an anthropologist of development (Harrison, 2003). For Harrison, it is implausible to separate these two roles. Others have challenged this view and made their own efforts to play the two roles at the same time (Groot, 2002; Khanal, 2003). Inspired by these authors, I will also delve into this risky issue of mixing up my two roles (see in particular Chapter 4).

In order to achieve my research objectives and get the answers to the research questions (presented in Chapter 3), I used traditional social and natural science research methods and techniques to generate data, such as case study, survey, interviews and participant observation (see the right column in Table 1.1).

1.7 Defining key concepts

At the very beginning of the thesis, I would like to provide the preliminary definitions of the concepts adopted by the GAAS team at the start of the CBNRM research. As the work progressed, the GAAS team was challenged to reflect at a deeper level on the meaning of these concepts in the project context. These developments in understanding are discussed in appropriate sections of the thesis.

Aspects	*The GAAS-CBNRM action research*	*My PhD research*
Objective	• To test through practice how CBNRM can work in China	• To understand what the GAAS team has done to promote CBNRM in China, how the team operated and why, and to assess the impact of its CBNRM action research on the natural resource base and livelihoods of farmers
Nature of research	• Participatory • Problem-solving • Learning-by doing	• Theoretical framework • Empirical evidence • Embedding in scientific discourse
Methodology	• Iterative cycles of: Diagnosing, planning, action, monitoring and evaluation, reflection • Proof of desirable impact	• Case study • Survey • Participant observation • Key informant interview • Second-hand data • Evidence of plausible conclusions
Expected outcomes	• Improved natural resource management and livelihood of farmers • Enhanced capacities • Locally adapted CBNRM principles • Identified scaling up strategies	• Data generated • Data analysis • Conclusions & recommendations

TABLE 1.1 Differences between the GAAS-CBNRM action research and my PhD research. (Source: This thesis)

Community

In this study, community refers to natural village, which is defined by the settlement pattern of the rural population. Villagers have a strong self-identity related to their natural village: when being asked where they are from, they normally refer to the name of the natural village where they live. In addition, the natural resources (e.g., arable land, forestland, grassland, and wasteland) are entitled to the natural village in most of cases, i.e., the natural resources are collectively owned and managed by all people of the whole natural village. 'Community' in this study is taken to be constituted in relationships constructed in interdependence rather than assumed as a state of social harmony or equity.

Community-based natural resource management (CBNRM)

CBNRM is an integrated approach to address resource degradation and rural poverty. It places the local resource users in the centre of decision-making about how the

natural resources should be used and managed. It aims to empower poor farmers through capacity building and participation. It pays particular attention to social and gender variables.

Common-pool resources
The GAAS team defined common-pool resources as the resources owned by the whole village and collectively managed (access and use), such as village forests, grasslands, drinking or irrigation water, and the village fund.

Institution
Institution refers to a set of rules and regulations governing the natural resources. These rules and regulations define who has access to and control over the resources, when and how. The GAAS team considered the ways and processes by which farmers organized access and use and the design and implementation of rules and regulations as the formation of institutions.

Collective action
Individual farmers or one local community alone cannot address the problems of common-pool resources, which are used interdependently by different groups of farmers or different sectors. When different resource users make jointly agreed decisions and carry out these decisions to solve problems, we speak of collective action.

Stakeholders
The stakeholders are those who have interests and stakes in natural resource use and management; they could be individual people, groups or organizations. In the context of the Guizhou CBNRM research, stakeholders included farmers/communities, government officials/township government, county government and its line ministries, the GAAS researcher/research institute, private business people (fish farm, iron factory, etc), and program officers of IDRC and the Ford Foundation (the international donors supporting the research).

Conflict
The GAAS team considered the disagreements, disputes and physical fights over natural resource use and management as incidences of conflict.

Facilitation
Facilitation refers to the activities performed by the GAAS team to promote collective actions among stakeholders, including involving different stakeholders in all kinds of natural resource management activities, creating platform for communication and negotiation, and coordinating agreement implementation, etc.

Partnership
In order to achieve a common goal (sustainable use of natural resources), different stakeholders share responsibilities and benefits in natural resource management. This relationship among the stakeholders is considered a partnership.

Scaling up
Expanding impacts of a CBNRM approach on the environment and lives of poor people to a larger scale through integrating CBNRM principles into government policy and programs and through farmer-to-farmer diffusion.

1.8 Structure of the thesis

Chapter 1 introduces the context of problems related to natural resource management in China and the Chinese government's efforts to address these problems as well as the outcomes. The chapter also presents the research problem and the objectives of the study, and provides initial definitions of the key concepts. The relationship between the GAAS team's CBNRM action research project and my PhD research is briefly introduced in this chapter.

Chapter 2 reviews the land reform in China since 1949 and the implications of the land reform for natural resource management, with a focus on the impacts of the property regime under the Household Contract Responsibility System on forestland, grassland and irrigation systems. This chapter also introduces the GAAS-led and Ford Foundation and IDRC-supported CBNRM action research project and its efforts to address the issues in natural resource management. The research area is also described.

Chapter 3 discusses the theoretical arguments and the key concepts of this study and their relationships. The analytical framework and research questions are developed based on the theoretical discussion.

Chapter 4 presents the methodology applied in this research, including research strategies and the methods used for data generation and analysis. In this chapter, my roles in this PhD research and in the CBNRM action research are clarified.

Chapter 5 identifies the key stakeholders and analyses their interests and stakes in use and management of natural resources. It also discusses and analyses the interdependence of multiple stakeholders in natural resource management and their struggling for stake-holding in the natural resources. The chapter shows that uncontrolled competing claims by different stakeholders with diverse interests cause social conflicts and damages to the natural resources. The chapter concludes that concerted actions among stakeholders are needed to address the resource dilemma.

Chapter 6 presents a case study of Dabuyang village, giving a general profile, outlining the historical changes in natural resource management over 50 years, and describing in detail how the GAAS team practised CBNRM in this rural community, with the focus on how the GAAS team facilitated farmer organizational development, village-based community institutional development, and capacity building to promote collective action for sustainable, equitable and effective natural resource management.

Chapter 7 examines the impacts of the CBNRM action research of the GAAS team on natural resource management and livelihood improvement of farmers by presenting the results of a set of comparative studies: (1) changes in livelihood of 200 households in eight villages, over 11 year, (2) comparison between the villages in Kaizuo township and in another township called Malu regarding resource management institutions for forest, water systems, and grassland.

Chapter 8 reviews and analyses the GAAS team's CBNRM scaling-up strategies and efforts to institutionalize CBNRM principles in the government system by working with the Kaizuo township government and four line ministries of Changshun county. The chapter also reflects on the constructive and destructive factors that influence CBNRM scaling-up.

Chapter 9 presents the major findings and conclusions of the study. The chapter also points out the policy implications of the study for sustainable natural resource management in China. Some recommendations for further study are made.

2 The context: brief historical background, and the genesis of the GAAS action research efforts

Qiu Sun with Ronnie Vernooy

This chapter provides a historical overview of selected main events of the last 50 years, as these relate to natural resource management in China, with a focus on the impacts of the changing arrangements and rules governing resource access and use. It aims to provide the reader with an understanding of the main factors and characteristics of the context that have influenced the development and evolution of natural resource management in China. The chapter also provides general background information on the context of the research area, and introduces the GAAS team's research efforts. It aims to explain the motivation for starting the GAAS work. The material presented draws on secondary literature and research reports, as well as on the preliminary diagnostic and exploratory studies carried out by the GAAS team as we began our work.

2.1 Land reform since 1949

Rural China has experienced three radical agrarian reforms since the foundation of the People's Republic of China in 1949. Land tenure changed along with each of the reforms, and so did the institutional system of natural resource management.

Collectivization

The first land reform was carried out during 1949-1951, and aimed to seize land from landlords, rich farmers and clans and then redistribute it to the poor peasants. The peasants received title to these lands (Ho, 1998; Yu, 2001). However, this private land ownership regime did not exist very long. Starting in 1952, the Chinese government rapidly collectivized agriculture, through the establishment of so-called Mutual Aid Teams, which were regrouped into Lower Agricultural Producers' Cooperatives, then into Higher Agricultural Producers' Cooperatives, and finally, into the establishment of the People's Communes in 1958 (Ho, 1996; Xiang, 2000; Yu, 2001). The Mutual Aid Teams (MATs) were formed based on the willingness of peasants to pool their labour and assets, but the individual ownership of land and the other major means of production remained with individual peasant households. The pooling of labour and assets followed some of the traditional peasant customs of helping each other in their farming activities (Ho, 1996). Lower Agricultural Producers' Cooperatives (LAPCs) were made up of several MATs, and through the

MATs, peasants obtained beneficial returns from the agricultural production according to the amount of land, capital and labour they contributed (Ho, 1996). Higher Agricultural Producers' Cooperatives (HAPCs) were larger than LAPCs. Under LAPCs and HAPCs, the nature of land ownership did not change: land remained owned privately by individual peasant households. However, the establishment of LAPCs and HAPCs was clearly based on the state's intention to organize the rural population, and keep control over the entire production process (Xiang, 2000).

The Great Leap Forward

The People's Communes were established in 1958, as a result of the Great Leap Forward. In less than one year time, China's 120 million farmer households were 'organized' into about 26,000 communes. On average, each commune had more than 4600 rural households (Xiang, 2000).

The creation of the commune system was not simply accomplished through the appropriation of land and other production assets by the state. It was also a process of tightly disciplining farmers and taking control of the rural areas. Through the highly collectivized commune system, the government controlled agricultural production and access and use of natural resources. The central government made annual national production plans for agriculture, industry and the other sectors. According to these plans, tasks were allocated to the production units through the government system, from top to bottom. Based on these assigned tasks, the production units, such as the production teams in the communes, produced grains, livestock, timber and other agricultural products. As Xiang (2000: 44) points out: "(...) during the commune period there was a high level of collectivization, and the vast majority of farmers' assets belonged to the collective. Farmers were not permitted to engage in private economic activities and the state had a monopoly on all land and other production resources".

During the commune period, the government's centrally planned 'Great Leap Forward' caused massive deforestation all over the country. The Great Leap Forward was a hugely ambitious campaign initiated by the Chinese government in 1958 to produce steel and iron all across China for what was called 'catching up with the U.S.A. and the Soviet Union'. Farmers were mobilized to make iron. They built self-designed stoves; cut trees to fire the stoves, and melted whatever was made of iron into 'industrial' iron (they even sacrificed their iron cooking pots). This campaign caused dramatic degradation of forests in China.

Three-level ownership with the team as basis

The initial commune management was ineffective and inefficient because of excessive size of the commune. Therefore, a 'three-level ownership with the team as basis' arrangement was induced in 1962 after 'three-years of natural disaster' (1959-1961). The natural disaster caused national-wide famine. The 'three-level' referred to commune, production brigades (dadui) and production teams (xiaodui). A commune consisted of a number of production brigades depending on the population in the

commune, and a production brigade comprised several production teams each of which was made up of 20-50 households. There was administrative hierarchy from the commune to the production brigade and to the production team. Under the 'three-level ownership with the team as basis' arrangement, the production assets, including arable land, forests, grasslands, irrigation systems, livestock, and farm implements, were owned by the commune or production brigade or production team, depending on the scale of the resources. The scale determined which level could coordinate the use and management of the resources. For example, if an irrigation system covered several production brigades and its use and management needed the commune to coordinate, then it was owned by the commune. But most of production materials were 'collectively owned', used and managed by the production teams. Each production team was the basic unit to manage agricultural production, labour, and distribution of farm products. It did independent accounting, and was responsible for its own surpluses or deficits. This arrangement was shortly called 'with the team as the basis' (The Revised Working Act for the People's Commune, September 1962).

However, under this arrangement, it was still not clear who actually owned the resources (including arable land, forest, grassland, and other productive assets) and who had the management responsibility for the resources. The Concept of 'collective' during the People's Commune had not the same meaning as commonly used to refer to a group of people who share common things or interests, make joint decisions and work together to achieve a common objective. The 'collective' in the commune era was a rather confusing word with complicated meanings. The People's Commune in China in fact was an organization combining political, social and economic functions. As Xiang (2000: 45) describes "... As a form of economic organization, the commune was responsible for the coordination of all production activities. As an administrative organization, it had to comply with the orders from higher levels of government and undertake administrative affairs. In the eyes of the farmers, the commune was the symbol of state power." Moreover, the individual resource user was called 'sheyuan', meaning, a member of the commune. At that time, 'sheyuan' worked for the 'collective', and were organized collectively to work on the land. Their work was rewarded with work points according to the amount of effort made. The political meaning of 'sheyuan' was perhaps more important than the socio-economic one: it meant, 'you are one of the collective'. In this way, the Chinese farmers had become fully organized. They belonged to the collective and led a 'collective' life. As Xiang (2000:45) describes it:

> "Farmers' production and livelihoods-and even their survival-were directly dependent upon these political organizations. The People's Commune system became a semi-militarized organization. Social organization was militarized. All actions became seen as a war campaign. Farmers' individuality was subsumed under the collective organization, and individuals were unable to act independently of the collective. This was captured in a popular song of that

> time: *'The people's commune is a long green vine, commune members are fruits on the vine; the fruits cannot leave the vine, and the vine cannot leave the fruits...'* In the process of collectivization, traditional relationships based on kinship, commonplace of origin and the clan organization disappeared, and religious activities were stopped. All these changes fundamentally altered the traditional organizational structures of rural society."

Under the commune regime, the 'sheyuan' were only allowed to have very limited assets for their basic living and they were not allowed any individual income generation activities. It is therefore no surprise that the 'sheyuan' had no incentives to either work hard for higher production or to manage the lands properly. This phenomenon was called 'chidaguofan', meaning, 'eating from the big rice pot'. The 'big rice pot' was 'the collective'. The commune regime did not encourage the production incentives of the rural people, but instead encouraged 'free-riding' at the cost of production and natural resources. This took place all over China, including in Guizhou province.
Here, we want to point out that the use of 'collective ownership' to describe China's natural resource management during the commune regime is confusing. Therefore, it is necessary to make it clear that the land property under the People's Commune regime is not a real collective ownership of the commune members, because they did not enjoy free rights to make decisions on how to use and manage the land resources. During the period of 1966-1978, the Chinese government adopted a 'grain-first' policy (yiliangweigang), which emphasised grain production in order to achieve food security and maintain social stability. While doing so, it overlooked the natural resource system as a whole, neglecting its proper development, management and protection. As a result, ten of thousands of hectares of forestland and grassland were converted to farming land, and many lakes and wetlands were drained and filled to become farming land. This led to serious environmental problems, such as (more) deforestation, degradation of grasslands, soil erosion, and the drying up of water sources (Ho, 1996; Yuan, et al., 2007).

The Household Contract Responsibility System

In the late 1970s and early 1980s, after Mao's death, the Chinese government initiated economic reforms in the country, transforming the centrally planned economy into a (more) market oriented economy. The economic reform started with the agricultural sector in the rural areas. In the reform, the commune regime was abolished and replaced by the Household Contract Responsibility System (HCRS). This was a radical institutional change regarding the management of land and other resources. Under the HCRS, the arable lands were evenly contracted to the individual farmer household according to the number of the family members at that time. Though the land ownership remains formally under the title of the collective, farmers were now being granted use rights and the right to make decisions about land management, agricultural production, and products. Farmers were not allowed to change the purpose of land use without government permission, for example, if they wished to build a

house on a piece of land normally used for maize production. In some areas, the lands were titled to the administrative village (xingzhengcun), while in other areas, like Changshun County, the lands were owned by the natural village (cunminzu). In the CBNRM research area, the natural villages collectively own the farming lands, forests, and grazing lands. Therefore, in this study, when we mention 'the community', we refer to the natural village, i.e., the cunminzu.

With the introduction of the HCRS came a new tax system. A certain tax[2] (in the form of grain in grain production areas) was assigned to each farmer household according to the area of farm land it contracted. The rest of the produce belonged to the individual farmer households, and they had rights to decide what to do with the products, be itself consumption or sale in market. Thus, farmers' incentives to boost farming production were increased remarkably by linking production activities directly to personal benefits. In this sense, China's agricultural lands under the HCRS remain under collective ownership or village common property, but with private use rights by individual farm households. The institutional transformation in land tenure dramatically changed the socio-political structure of rural China, the relationships among people, and the relations between people and natural resources. It will be discussed in more detail the following chapters.

Period	*Arrangement*	*Land users*
Before 1949	• 'Feudal' relationships • Commons • open access	• Clans, landlords
1949 - 1952	• Private land ownership	• Farmer households
1953 - 1958	• Cooperatives	• Mutual aid teams
1959 - 1981	• State control • Three-level ownership	• Commune members
1982 - present	• Household Contract • Responsibility System	• Farmer households • Mix of collective ownership and private use rights; uncertain rules of access and use

TABLE 2.1 Timeline of land management arrangements, 1949 to present. (Source: Field data)

2 The agricultural tax (except for some cash crops, such as tobacco, for example) was abolished in China in 2006, to increase grain production and farmers' incomes. (The report of the third session of the 10th People's Congress, 1995).

In order to ensure that farmers have the motivation to continue taking good care of farmlands and to ensure that farmers have access to basic living assets, the central government made a decision to extend the time of land contract from the original five years to 30 years, no matter whether the number of family members increases or decreases over time. At the same time, the government allowed the use right of the contracted lands to be inherited, and that the land could also be subcontracted, under the sole condition that changes in the use purpose of the land would be made (as stipulated in the Land Contract Law of Rural Area of P.R. of China, 2003).
A summary of this brief historical overview is presented in Table 2.1.

2.2 Emerging issues in natural resource management

The HCRS has been considered a successful reform, in particular in terms of the rapid increase in agricultural production and in farmers' overall incomes. According to state statistics, the total grain output in 1978 was 305 million tons and increased to 402 million tons in 1987 (Hu, 1997:176). Based on this success, the Chinese government applied the HCRS to other natural resources, such as forestlands (Cook & Mallee, 2004) and grasslands (Ho, 1996). However, applying the HCRS to forestlands and grasslands does not necessarily promote farmers' incentives for sustainable use and management of these resources. A very different picture presents itself in resource management. Many researchers have shown that the introduction of the HCRS has caused serious degradation and destruction of forests, grasslands and irrigation systems (Cook & Mallee, 2004; Ho, 1996, 1998; Hu, 1997; Liu, 2006; Nickum, 1998; Zhang & Kant, 2005). The following sections give examples of how management institutional changes are impacting on forests, grasslands and water in China.

2.2.1 Forest management under HCRS

China's forests are either state-owned (42% of the total forest areas) or collective owned (58% of the total forest areas) (NSFB, 2000 cited in Zhang & Kant, 2005: 290; SFB, 2000). This thesis focuses on the collective forest.
Since 1981, following the example of arable land, the decision was made to promote forest production through contracting forest management rights to households. Consquently most of the collective forests were allocated to rural households as 'family forestland' (ziliushan) and 'responsibility forestland' (zerenshan). 'Family forestland' refers to the forestlands that are allocated to the individual farmer households in villages for free use without a contract with the village (thus no obligations). 'Responsibility forestland' refers to the forestlands that are contracted to the individual household or a group of households with defined rights, responsibilities and benefit sharing spelled out in the contract signed with the village. The family forestlands were allocated basically for farmers to collect firewood, while the responsibility forestlands were contracted to farmers for timber production. So the family forest-

lands were much smaller than the responsibility forestlands. With this tenure arrangement, over half of China's forest lands became legally owned by rural villages, with the use rights having been allocated to households. The forest tenure in now characterized as 'collectively owned, privately managed' (Zhang & Kant, 2005). It means that the villages own the lands (forestland), but the individual farm household owns the trees and non-timber products that grow on the forestland. The collective property rights and private use rights were legally recognized through implementation of the 'Decisions on the Issues of Forest Conservation and Forest Development by the State Council' in 1981, or known as the 'Three fixes' (linyesanding). The 'Three fixes' were to (1) fix property rights of village collective by issuing property certificate, (2) fix the use and management rights of the farm households for family forestland, and (3) fix contract responsibility system for forest production. However, unlike arable land, HCRS does not result the increased incentives of farmers to manage the forests or forestland in a sustainable manner, and caused massive degradation and destruction of forests (Cook & Mallee, 2004; Heidi, et al., 1998). Wu and Cao (cited in Ho, 2005:115) reported that "over the period 1989-93 a total of 2 million ha of forestland was converted into non-forestry land, whereas an estimated 7.6 million ha of forest was cleared or degraded by illegal felling, forest fires, or bad management practice." In the CBNRM project site, the forests, except the holy forests, were seriously damaged soon after the adoption of forest contract responsibility system. The forests in some villages were even shaved and the forestlands were open to all (Chen, et al., 1995; Zhou, 2000). After that, some villages took back the responsibility of forestlands or even the family forestlands, but it was difficult for the villages to revive the traditional management systems that had been effective before the commune era or to organize farmers to develop a new management system for their collectively owned forests, due to rapid socio-cultural and economic changes (Zhou, 2000; Field notes, November 2004). We will return to this in the following sections.

To respond to the rapid degradation of forestlands, the Chinese government started to make efforts to change the situation. These included setting up a quota system for annual tree cutting; initiating programs for reforestation, natural forest protection at headwater regions of large rivers, launching a logging ban in natural forests and reconverting sloping farmland to forest; and establishing forest conservation areas, such as natural reserves and national parks. It revised the Forest Law in 1984 and again in 1998. However, these efforts are very much managed in a centralized and top-down manner, restricting farmers' use rights of forests. For example, the log harvesting quotas are assigned annually from Beijing to the provinces and then all the way down to the villages. When a farmer wants to cut a tree - regardless of whether it grows on collective land, forest land allocated to his or her family, or directly around the homestead - he or she needs to obtain a logging permit from the township Forestry Station, and pay a fee (Cook & Mallee, 2004).

The evidence suggests that these strict measures have failed to improve China's forests. We argue that these various restrictions on farmers' access to forests make

them have little sense of ownership of the collective resource. As a result, they have little or no incentives to plant trees and to protect the forests.

2.2.2 Grassland management under HCRS

China's grasslands suffered severe degradation after the rural economic reforms (Banks, 2003; Ho, 1996, 1998; Jiang, 2005, 2006), especially in the poverty-stricken areas where farmers heavily rely on the resource base for their livelihoods. The HCRS has been applied in the livestock sector since 1980s, initially through the distribution of livestock and then of grasslands to individual households. However, the livestock are privately owned by households, but the grasslands are collectively owned by villages. Use rights are contracted out to households. At the beginning of the reforms, the duration of a grassland contract was not clear; this two-tier responsibility system therefore encouraged farmers to intensify grassland use for pursuing short-term income (Jiang, 2005). In some of the grassland areas, there was a long tradition of mobile grazing with flexible grassland boundaries or even overlapping boundaries (Ho, 1996). This kind of system added to the difficulties of protecting the household-based contracted grasslands, and in many places, these unclearly defined grasslands became 'nobody's' grasslands. Overgrazing and the opening up of new grasslands resulted in serious degradation. Studies showed that in 1987, Inner Mongolia's (one of the major grassland provinces in China) livestock carrying capacity was surpassed by 30% (Bao et al. 1997, cited in Jiang, 2005: 650). By 1997, 100% of grasslands in Inner Mongolia had the problem of overgrazing (Yao et al. 2001, cited in Jiang, 2005: 650). The percentage of degraded grassland at the same period in Inner Mongolia increased from 40% to 70% (ibid: 650).

To fill the management institutional gap left by the dismantled commune, the Chinese government enacted its first Grassland Law in 1985. The law defines two forms of property right: state ownership and collective ownership. Both the state owned and collective owned grasslands could be contracted or leased to individual farm households (The Grassland Law, 1985). But the Grassland Law does not make clear the period of time term of contracting. This encouraged farmers' intensive use of the grasslands for short-term economic benefit. In order to promote farmer's incentives to sustainably use and properly manage their contracted grasslands, later, in 2002, the Rural Land Contracting Law defined the contract term of grassland from 30 to 50 years and 50-70 years for forest lands (Rural Land Contracting Law, 2002). However, these laws had little success in stopping grassland degradation (Ho, 1998, 2005; Jiang, 2006).

In Guizhou province, most of the grasslands are in the hills or mountains. In general, the grasslands in most areas of Guizhou have become open access. In fact, the grasslands in Guizhou are called 'huangshan', meaning, wastelands, i.e., land seen as of little use. This is the major reason that the grasslands in Guizhou have not been contracted or leased to farmer households, in contrast to arable lands or forestlands. They are still collective used by rural farmers. However, this collective form of grassland use is in fact open to all. Animal husbandry was not a major source of

agricultural income in Guizhou. Cattle and buffaloes were raised as ploughing animals and as manure sources. According to an investigation conducted in 1995, animal husbandry accounted for less than 30 % of farmers' cash income in the CBNRM project villages, with the most from pig raising (Chen, et al., 1995). The main threat to grasslands was farmers' encroachment, through the transfer of grasslands to arable lands, which, usually resulted in serious soil erosion in mountainous areas. The most serious consequence of soil erosion in Guizhou is known as 'rock desertification'. Guizhou is a typical Karst region. One of the distinct features of Karst is rock desertification. It is reported that, so far, Guizhou Province has 61.9% of its territory potentially affected by rock desertification (GZGOV, 2005).
Transferring forestlands and grasslands to farmland on hillsides or mountains with a 25 degrees slope or higher was halted by decree in 2000 by the national government. In 2000, Guizhou became one of the pilot provinces for the government program called 'tuigenghuanlin'. The farmlands on hillsides or mountains with a slope of 25 degrees or more, can no longer be cultivated and must be reconverted to forestland or grassland. Farmers receive a subsidy for this conversion process from the government, in the form of 200 kilograms of grain and 20 RMB per mu, per year, for a maximum of eight years. There has been considerable debate about the impacts of this ban on rural livelihoods, in particular in the western parts of China. As animal husbandry has more recently become an important income source for many of the hillside and mountain farmers, the numbers of animals have increased rapidly, in particular goats, which recently have become very popular in Guizhou. Grasslands are under a new threat of overgrazing.

2.2.3 Management of irrigation system under HCRS

Most of the irrigation systems in rural China were constructed during the commune period (Nickum, 1998). During the commune era between 1965-1979, the total irrigated area of China increased by 36 per cent, and the size of the power-irrigated area increased more than twofold (Liu, 1994 cited in Hu, 1997:180). These water systems were mostly financed by the government, and communes mobilized labour and generated the necessary funds to construct and maintain them. The ownership and user rights of these water facilities were vested in the communes or production brigades or production teams depending on the scale of the irrigation systems.
Since the rural reforms in the early 1980s, property rights over these irrigation systems have become ambiguous. Formal property rights were not clearly transferred to the new administrative agencies (township or village) that were set up during the reform process (Lohmar, et al., 2003). Moreover, the household contract system has weakened the collective functions from township to village (Hu, 1997). Therefore, construction of new systems and maintenance of the existing systems have become a problem; because neither township nor village has an incentive to take responsibility for the construction and maintenance (Lohmar, et al., 2003). At the same time, most individual farm households with small and fragmented crop fields find it hard to accept the responsibility for maintaining the irrigation system.

Since the reforms, the government has gradually decentralized the financial system. Financial responsibility was partly shifted to lower level of governments, which became responsible for medium-scale rural water projects. The central government focused on the finance of special and nationwide projects and management institutions. This decentralization process has created a number of problems. Many provinces, such as Guizhou, do not have the financial capacity to make adequate investments in irrigation infrastructure, and they also no longer wish to force farmers to contribute labour for infrastructure construction and maintenance. Overall, the government's funds invested in maintenance of reservoirs, irrigation and drainage facilities have been neglected and significantly decreased (Hu, 1997). The national records for total area irrigated and for power-irrigated areas indicate a sharp decline in the 1980s (Liu, 1994, cited in Hu, 1997: 180). Facts speak for themselves: over a 16 year period, a total of about 82400 hydropower stations in rural areas in 1974 dropped to about 48,700 in 1994 (ibid). Most of the stations and facilities associated with them have been either abandoned or stolen. The former collectives could mobilize farmers to carry out capital construction at very low labour costs. But now the administrative institutions of villages and township find it increasingly difficult to accumulate the funds and labour needed to maintain the existing infrastructure and expand rural production (ibid).

In Kaizuo township, where the CBNRM project is implemented, as of today only three pump stations (out of the total 15) still work. The rest have been damaged or the pumps have been stolen during the first a few years after the introduction of the HCRS (Field notes, July 2004). Canals have been discarded and some were damaged by farmers on purpose: to expand their fields by filling and levelling up the canal or to get bricks from the canal structure. Irrigated fields were reverted to rain-fed production. In addition, small ditches between the paddies were dug out. As a result, to irrigate one field meant one had to cross various others. This caused a lot of conflicts over water among the villagers (Xia, 2000).

To address the decrease in irrigated acreage, the Chinese government enacted a Water Law in 1988 and revised it in 2002. The law emphasises the importance of water pricing mechanisms and market leverage in water management. The law states all water, including groundwater and surface water, are state property. The Ministry of Water Management and the Bureaus of Water Management at local government levels manage the country's water resources on behalf of the state. The government agencies of water management finance and manage large and medium scale irrigation systems. Small irrigation systems are managed by local collectives (Wang & Huang, 2001).

Several issues remain unsolved in irrigation water management. First, the water management agencies at local levels lack sufficient finances for maintenance of the water systems (Lohmar, et al., 2003). Second, a lack of accountability and transparency of government agencies in water projects and system management causes poor performance of irrigation systems (Ehrensperger, 2004). Third, there are few

(effective) institutions that encourage collective action for the sustainable management of small scale water systems at community level (Li & Li, 2002; Lin, 2002).

2.2.4 Crosscutting observation

In sum, the HCRS regime has not resulted in the sustainable use of forest, grassland and water resources in rural China (Banks, 2003; Cook & Mallee, 2004; Ho, 1996, 1998; Hu, 1997; Jiang, 2005, 2006). The longer-term productivity of these systems has not seen any increase comparable to the arable land system under the HCRS. The reasons are several. First, the HCRS ignores the technical and physical differences between the arable land system and forests, grasslands and water resource systems. These systems cannot or not easily be used and managed on an individual household basis because of inherent traits as common-pool resources, which, as a direct consequence, make exclusion (and thus restricted use) difficult. Trees in forests, unlike crops in farmers' fields that can be harvested annually, take years to mature.

Second, the HCRS has no corresponding institutional arrangements for ensuring the property rights of resource users. On paper, it seems clear that rural villages have ownership of collective resources, and according to most resource contracts, individual farmer households or groups of farmer households have use rights. But in reality, these rights are limited, and in most of the cases, the management and protection of these resources remain the responsibility of external bodies, e.g., the Forestry Bureau, Animal Husbandry Bureau, and Bureau of Water Management at the county level. Without a clear sense of property rights, farmers have little interest in making long-term investments to maintain the forests, grasslands and irrigation systems. For example, in the forest sector, farmers in fact only partly enjoy the property rights, e.g., they only legally own the physical asset rights of the forest or forestland (management and production rights over collective forestland and ownership right over forest products), but not the economic right, e.g., they can not harvest trees or sell trees without government permission, and thus cannot enjoy direct and clear economic returns (Zhang & Kant, 2005).

Third, the HCRS constrains traditional systems of use and management by rural communities, especially in ethnic minority areas where resources such as forests and grasslands have been and are collectively used and managed. The disappearing of local traditional management systems has made resource maintenance and protection rely on external government agencies. The shift from the commune system to HCRS was very sudden and without any preparation in terms of institutional arrangements. Farmers had little sense of ownership and responsibility to manage the collectively owned resources. The consequence was that, in practice, many of the forests and grasslands became open access resources, and water systems deteriorated. The HCRS has established a mechanism to provide farmers incentives to increase their family economy, but has failed to provide a mechanism for guiding farmers' behaviour towards sound land management, and for safeguarding common property resources and agricultural infrastructure. This in turn, is hindering more

harmonious economic growth, sustainable resource use and management practices. In Table 2.2, we summarize the observations presented in this section.

Period	*Natural resource access and use*	
Before 1949	'Regulated by social rules; light inequality	High biodiversity; grassland and forests generally in good condition
1950 - 1958	Seized land from landlords and clans and allocated to peasants; some benefit sharing	Short duration, no major impacts
1958 - 1982	Regulated by the state; equal stakes in poverty; equal division of labour, no self-motivation	Major impacts on natural resource quality; forest clearing; some grasslands damaged because of mining activities, but number of animals low; irrigation facilities built
1982 - present	Household Contract Responsibility System over collective resources. Uncertain rights and rules of access and use; land-holdings fragmented	Forests and grasslands damaged by unregulated use; water facilities not maintained

TABLE 2.2 Implications for natural resources management of use and tenure regimes. (Source: This thesis)

Having sketched and analyzed the general evolution of natural resource use and management in recent times, we now turn to the genesis of the GAAS research efforts to address rural resource issues.

2.3 The start of international research cooperation: GAAS-IDRC interactions

In 1990, a small team of researchers at the Guizhou Academy of Agricultural Sciences became interested in addressing rural resource questions and took the initiative to become a research partner of Canada's International Development Research Centre (IDRC), an agency established to support research for development in 'the South' (more about IDRC in a subsequent section). This was the beginning of a lengthy and fruitful cooperation. The focus of cooperation between the two organizations has shifted over time, from natural science-dominated and technology-oriented research to interdisciplinary and a 'hard/soft systems' combined research approach. These changes were based on critical reflections on our experiences, both from the side of the GAAS researchers, and from the side of IDRC program staff (see, for example, Vernooy, et al., 2003.

From 1990-1993, with IDRC's technical and financial support, the Soil and Fertilizer Institute of GAAS carried out a research project entitled 'Integrated Agricultural Development in Red-yellow Soil Areas of Guizhou Province, China'. The project aimed to study agricultural technologies that could improve agricultural production. A package of technologies was developed and tested, including soil erosion control measures, new planting patterns of both paddy and upland fields, improvement of soil fertility, and introduction and testing of new varieties of crops and fruit trees. Most of the experiments were conducted by the GAAS researchers (Qiu Sun was one of them) on lands rented from local farmers. At the end of the research project, the best technical options were recommended to farmers based on GAAS researchers' experimental data. However, the farmers did not want to adopt these 'best technologies' without subsidies. For example, the new technology of alley cropping along contour-lines with crops planted between alley crops showed very good result in terms of crop yield and control of water loss and soil erosion in the experimental plots. We realized though that farmers were only interested in trying these 'good' technologies because the GAAS team had provided them with free seeds or seedlings for alley cropping. Why were farmers not keen on adopting 'good' technologies by themselves?

This question made the GAAS researchers reflect on how our research could meet farmers' interests and needs. We came to realize that we would never understand farmers' interests and needs if we only focused our research on technology development, ignoring the users of technology and the socio-cultural and environmental context in which the users are imbedded. Coincidentally, more or less at that moment in time, IDRC shifted its research program from a technology focus alone to more multidisciplinary and interdisciplinary concerns. As the then newly developed Food Systems under Stress program theme statement pointed out 'neither technology nor institutional changes nor policy reform alone is sufficient to address poverty'.

2.3.1 CBNRM program initiative of IDRC

Building on the Food Systems under Stress programme efforts (1992-1997), IDRC started the so-called Community-Based Natural Resource Management program initiative in 1997. The CBNRM program aimed to address research on poverty reduction and natural resource sustainability in marginal areas of rural Asia (Tyler, 2006b). The CBNRM program distinguished its work from the traditional approaches to poverty and environmental issues by placing livelihoods improvement of poor people at the heart of natural resource management. It assumes that environmental protection efforts cannot achieve the goal of sustainable development without giving consideration to people's livelihood, especially the poor people whose well-being heavily relies on natural resources. The failures in many protected areas illustrate this point. CBNRM implies people-centred natural resource management (Tyler, 2006b). For a succinct description of the rationale informing CBNRM, see box 2.4.

The CBNRM program deals with resource degradation and rural poverty by promoting research for development innovation to improve the productivity and sustainability of local resource use. These innovations can be technical, such as intensifying shifting cultivation or improving aquaculture. They can also be institutional or policy-focused. However, neither technology nor institutional changes nor policy reform alone is sufficient to address poverty because in many cases resulting benefits are captured by those who are already better off. Therefore, CBNRM addresses the interactions among the factors that influence natural resource access, use and management patterns. The innovations must be built on voluntary improvements to local knowledge and practices, rather than imposed from outside. It also requires recognition of the heterogeneity and multiple interests of different community members and outside resource users. The objectives of the programs are:

- To develop and transfer conceptual and methodological innovations for more productive and equitable natural resource use by communities in ecosystems facing environmental stress and degradation.
- To identify the factors leading to resource degradation and the differential impact such as degradation is likely to have on men and women.
- To develop technological, institutional and policy innovations that contribute to more productive and equitable resource management practices.
- To compare and exchange experiences and lessons between communities, research and government institutions in the region and Canada.

BOX 2.1 IDRC's CBNRM programme initiative prospectus 2000-2003 stated. (Source: IDRC, 2000)

The program suggests several important principles for CBNRM research (Tyler, 2006b). First, and most important, a CBNRM approach requires the active involvement of local people in the research efforts. This means paying careful and critical attention to the processes of participation of local people in resource use and management, with an eye to understanding their traditional knowledge, and an interest in exploring enhancive capacities for action research and joint learning. Second, using an interdisciplinary approach to address issues of natural resource management is essential. The complex and dynamic context in which resources are used and managed cannot be well understood without integration of different disciplinary knowledge and methods. Third, the approach emphasizes learning-by-doing. Attempts are made to involve stakeholders in diagnosis, planning, implementation, reflection and monitoring and evaluation of outcomes and impacts. To test this CBNRM action research approach, requires long-term, site-based fieldwork. Fourth, the approach also aims to build or strengthen the capacity of stakeholders to do and to manage research, including 'professional' researchers and resource users and

managers. IDRC's CBNRM research program has encouraged its research partners to explore the meaning of CBNRM in practice and to define the opportunities and constraints in CBNRM practice in local contexts across Asia, including China. This process involves shared learning and partnership building among the stakeholders. The program initiative on the one hand has provided some basic principles to guide its partners in CBNRM research, and on the other hand, has given its partners space and time to explore what CBNRM means to them and how to practise CBNRM in their situations.

2.3.2 Learning by doing and learning through reflection: CBNRM research in Guizhou

The birth of the CBNRM program at IDRC and the reflections of GAAS researchers gave birth to the first CBNRM research initiative in Guizhou. With IDRC's financial and technical support, the project entitled 'Community-based Natural Resource Management in Mountainous Areas of Guizhou Province, China' was initiated in March 1995.

When the GAAS team started the CBNRM research, CBNRM as an approach was very new in China at that time. The GAAS team was the first one to practise CBNRM in the province. In order to have a better understanding of CBNRM, GAAS management decided to change the previous project team leader who had a research background in both agronomy and agricultural policy. The new research team members were selected from different research institutes of GAAS to make up a diverse, interdisciplinary team. Three researchers from the previous project remained in the new CBNRM project (Qiu Sun was one of them). However, despite the efforts made by GAAS management, the team was still very much natural sciences oriented, which was not surprising given the larger institutional (GAAS) context then.

From our previous experiences the team realized that technology alone could not address the environmental problems, such as soil erosion, overuse of pesticides and chemical fertilizers, and degradation of forest. The team wanted to try a new way to address these issues. With mixed feelings (anxiousness, excitement and also nervousness), we started our journey of exploring CBNRM and making it work in China.

In January of 1995, just before the CBNRM project started, IDRC provided a 25-days training workshop for GAAS researchers and for researchers from other IDRC-funded projects in the region. The training was about participatory concepts and methods, including topics, such as, what is participatory rural appraisal (PRA) and how to conduct PRA, etc. In retrospect, terms such as 'community', 'community-based' and 'community-based natural resource management' had very little meaning for us at that time. There was no blueprint or even an example of CBNRM for us to consult. We also had no access to the scientific literature and no modern communication means (fax, internet). We simply held a very basic idea of 'CBNRM': we envisioned that it meant that rural farmers should be involved in the decision making about how the natural resources they relied on should be managed. Simply understood, we envisioned CBNRM as local people-centred natural resource use and

management. Therefore, we told ourselves, implementing CBNRM research is a learning by doing process, and also a process of capacity building. Although our practical experience base has grown over the years, we continue to be convinced of the basic conceptual value of these ideas. In Chapter 9 of this thesis, we present further reflections on our experience of action research and the development of our understanding of its contribution to development practice.

2.3.3 Ten years of action research and learning

So far, we have been practising CBNRM action research and learning for more than 10 years, and the summary of our learning journey is presented in the following box.

Phase I (1995.3-1998.2)

1. Physical, social, cultural and political settings
2. Natural resource profiles and problem identification regarding natural resource management
3. Local institutional development for sustainable natural resource management in two communities

Phase II (1998.3-2001.2)

1. Validation of experiences on local institution building in more communities (2 in Phase I and 4 new villages in Phase II)
2. Strengthening local institutional development through participatory monitoring and evaluation
3. Capacity building of farmers for self-governance of natural resources

Phase III (2001.12-2004.12)

1. Linking micro to macro: local institutions and policy making
2. Partnership development among stakeholders to promote recognition of local institutions of natural resource management
3. Capacity building of different stakeholders for practising CBNRM

Phase IV (2005.9-2008.8)

1. Expanding effective and gender-sensitive CBNRM practice in Guizhou and beyond
2. Strengthening local inputs into the policy making process
3. Bridging gaps and strengthen partnerships in natural resource management among key stakeholders
4. Enhancing stakeholders' capacities to scale up CBNRM

BOX 2.2 Evolution of Guizhou CBNRM action research (Source: Field data).

In the following section we briefly describe the various phases of our research journey. Before doing so, we first introduce briefly the research site of Kaizuo township in Changshun county, which, over the years, has become a second home of the team. During some periods, it has actually served as the GAAS team's first home!

2.4 CBNRM action research

Here, we would like to discuss what action research is and how the GAAS team conducted action research in the CBNRM project.

The main methodological feature of CBNRM is action-oriented research, or simply called action research. Action research has emerged in recent years as a significant method of intervention, development and change within communities and groups. Compared with traditional research, action research has the following characteristics: (1) its aim is to improve the situation rather to understand the situation. Therefore, the output of action research is not just a report or recommendations, but actions are taken; it is action that is researched, changed and re-researched; (2) action research is not done by the researcher alone. It also requires other stakeholders in the process and an agreement to undertake collective actions to address the problems or improve the situation, (3) the action research itself is a learning-by-doing process, a repeated cycle of problem identification, action planning and implementation, critical reflection on the action, and advancement to a new research and action cycle. As such, action research has no predicted outcomes, and achievements depend very much on a researcher's commitment and creativity (O' Brien, 2001).

The GAAS team's CBNRM approach is typical action research. The CBNRM research is a 'learning by doing' process - the GAAS researchers, Kaizuo farmers, and local government officials together identify problems, deploy joint efforts to resolve the problems, monitor and evaluate the outcomes and impacts of the efforts, and try again, based on the lessons learned.

The GAAS team followed the action research model, starting with collective diagnosis with local resource users aiming to identify the problems related to natural resource management and defining difficulties farmers face for their living. Action planning followed, aimed at addressing the identified problems and defined difficulties. These two activities were done in a participatory way, i.e., different stakeholders (local farmers, government officials and the GAAS researchers) actively involved in the processes of diagnosing and action planning. This is labelled 'participatory Rural Appraisal' (Chambers, 1994a; Chambers, 1994b). The GAAS team also used participatory diagnosis to understand different stakeholders', especially the marginalized groups' needs, interests and concerns, and reflected these in the action plans. After the stakeholders involved agreed on the action plan, the GAAS team and township government facilitated farmers to take action, such as (1) organizing farmers to build a drinking water system or a village road, collectively graze farm animals, operating micro-finance, etc; (2) developing community-based institutions to maintain the

drinking water system and the village road, taking care of common grassland, managing micro-financial funds.
Participatory Monitoring and Evaluation (PM&E) is a powerful tool to stimulate iterative learning in the action research cycles. PM&E was introduced to the CBNRM team and its research in 1998. PM&E involves resource stakeholders in decisions about what resource management initiatives should be monitored and how the outcomes should be measured, and acted upon (Vernooy, et al., 2003). The lessons generated from monitoring and evaluation were fed into the next cycle of learning. Figure 2.1 visualizes the action research cycle.

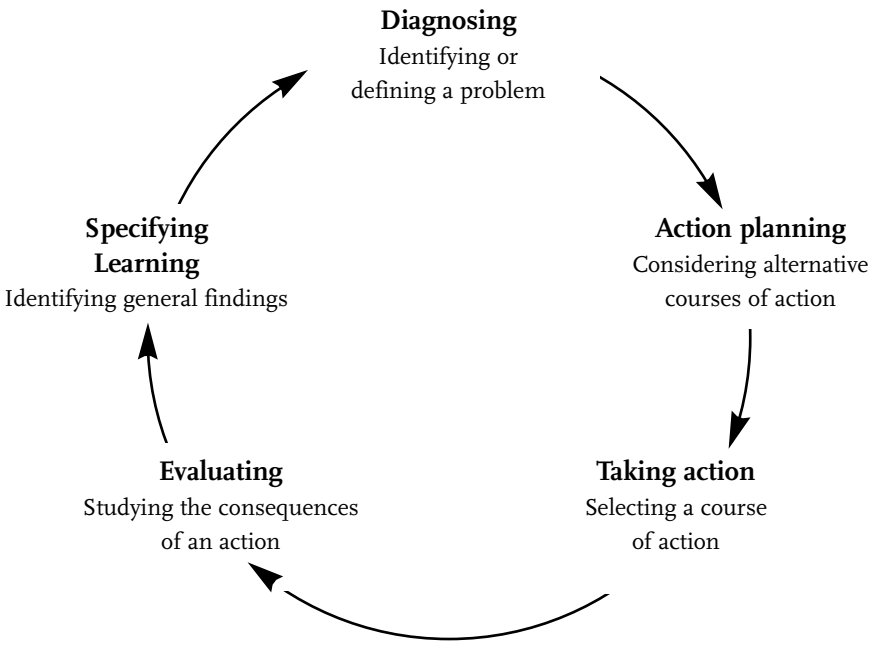

FIGURE 2.1 Action research model (Source: O'Brien, 2001).

Participatory monitoring and evaluation is the joint effort or partnership of two or more stakeholders (such as researchers, farmers, government officials, extension workers) to monitor and evaluate, systematically, one or more research or development activities (ibid). Over time, we have developed and strengthened our monitoring and evaluation skills, and also shared what we have learned with our partners in Guizhou (and with other Chinese colleagues who have come to realize the power of monitoring and evaluation, see (ibid). Throughout this thesis we refer to our effort to use monitoring and evaluation to strengthen our work; in Chapter 6 the extent to which this theoretical ideal was reached in the research analysed in this thesis is further discussed.

2.5 The research area

The CBNRM research started in Kaizuo township, located in the north of Changshun county, 60 kilometres from Guiyang, the capital of Guizhou province (Figure 2.1). Guizhou, which is located in the southwest of China, is a mountainous province with 93% of its territory being mountains and hills (GZGOV, 2005). Due to this, good farming land is limited; most land is hillside-land. Despite these unfavourable conditions, intensive agriculture is practiced in most places. Guizhou province is also the upstream region of two of the biggest rivers in China, the Yangtze River and Pearl River. Large areas of the province thus effectively serve as the watersheds of these two rivers. This is one of the reasons why Guizhou became the first pilot area of the National Natural Forest Protection Program in 1998, which, among others, enforced a logging ban (referred to earlier in this chapter)

FIGURE 2.2 Map of Guizhou province showing Kaizuo township (Source: Adapted from Tyler, 2006a).

Guizhou is one of the poorest provinces in China. In 1995, of the total population of 36 million people, 8 million people were living below the poverty line (with an annual per capita income less than 600 RMB, and an annual per capita grain production of less than 300kg), accounting for about 22% of the total population (The GAAS team, 1996). To the end of 2004, the rural population under poverty still remained 2.77 million, accounting for 10.6% of national total rural population under poverty. The poor people are concentrated in and around the remote mountainous areas. Most of them belong to ethnic minorities (Wang, Zhou, & Chen, 2006).

FIGURE 2.3 Miao, Buyi and Han (Photo: Zhao Zeying).

Changshun County is located in the south of Guizhou province (see Figure 2.2), at longitude 106°13'6"-106°38'48" and altitude of 25°38'48"-26°17'30". The annual temperature is 13.5°C -18.5 °C, with a high 22-25°C in July and a low of 4-6°C in January. The annual precipitation is about 1,400mm, and 88.5% of the total precipitation is concentrated in the months of April to October (Changshun County Annals, 2002: 59-60). The climate is favourable for rice, maize, and rape-seed production. The total land area is 1555 square kilometres with 444,991mu (i.e. 29,666 hectares) of arable land (ibid: 5). According to the government statistics, the population was 220,200 in 1995 and increased to 255,900 in 2005 (ibid: 674). The density of population increased to 166 persons/square kilometre in 2005 from 143 persons/square kilometre in 1995. The per capita arable land decreased to 0.13 ha/person in 2005 from 0.16 ha/person in 1995. Agriculture is the major income source for farmers and also the major revenue source of the county government. Taking these facts, natural resources are under great pressure. Changshun is classified as one of the poorest counties in China by the central government (The State Poverty Alleviation Office, 2003). The per capita income of rural population in Changshun was 446 RMB in 1995 (ibid: 674), and 1712 RMB in 2005 (Changshun Government Working Reports, 2005), while the national average for 1995 was 1578 RMB, and 3255 RMB for 2005 (State Statistical Bureau, 2006).

FIGURE 2.4 The landscape of Kaizuo township (Photo: Mao Miankui).

The Kaizuo Township consists of four administrative villages with 37 natural villages (cunminzu). It covers an area of 66.89 square kilometres and has a population of approximately 9500 people, with 4675 Buyi and 550 Miao ethnic people (Kaizuo township, 2006).

FIGURE 2.5 Map of Kaizuo (Source: The GAAS team, 1995b).

Agriculture is the major activity and income source of local people. They manage complex production systems consisting of irrigated and rainfed rice fields, less productive uplands and forested areas, and grasslands, also called 'wastelands'. Problems that people face, include low yields, little crop diversification, forests that in general are not in good health, and overgrazed common grasslands (Chen, et al., 1995).

2.6 Research phases

In Phase I, from 1995-1998, our research focussed on two villages. We tried to apply what we learned from the training mentioned earlier, by conducting a comprehensive participatory rural appraisal (PRA). One of the main results of the PRA showed that there were no farmers' organizations and regulations/rules to govern access and use of natural resource (the GAAS team 1995b). Based on these insights, we formulated a hypothesis to guide the research of the first phase: *local institutions are essential for sustainable natural resource management*. Our research interventions at this stage were focused on the facilitation of community-based institution building/strengthening, included helping in clarifying clear use right of the resources, setting up resource management groups, and making rules and regulations based on their customary norms. We tried to mobilize local people to take (new and innovative) collective actions. They contributed their time, labour and money to build/or repair and maintain water systems for both drinking water and irrigation; they took responsibility to manage common-pool resources, such as forests, grasslands, water systems, village roads, and a village development fund.

In Phase II, from 1998-2001, we targeted six communities (including the two villages from phase I) to test and validate the experiences generated so far. Community-based institutions were developed in the new four communities and were enhanced in the initial two communities through capacity building and action research. From the experience, the team realized that farmers' self-organization and effective implementation of management rules required improvement of farmers' capacities. Therefore, the hypothesis for the Phase II was *capacity building of farmers is fundamental for local institutional development*. Participatory monitoring and evaluation (PM&E) was introduced into the project, with guidance of an IDRC program officer (Dr. Ronnie Vernooy). PM&E served as a vehicle to enhance both researchers' and farmers' capacities in iterative learning cycles of reflection, planning, implementation, monitoring and evaluation, new action etc. The team also organized study tours, cross-farm visits, and training workshops for farmers.

In China, the government's recognition and appreciation of local innovations in natural resource management is very important. Without institutional support from the government, CBNRM could easily be undermined by external forces. The hypothesis for Phase III was *a supportive institutional environment for collective actions of local communities is the key for the sustainability of community-based institutions*. From

the end of 2001, the GAAS team has been trying to scale up CBNRM in Guizhou Province. The GAAS team has worked closely with the township government and the line ministries of Changshun county to adopt the notion of CBNRM and promote a community-based institutional development approach in selected government funded and executed projects. It was assumed that in the scaling up process, the government would come to understand the value of CBNRM (i.e., learning by doing); partnerships among farmers, researchers and government officials at township and county levels would be developed and capacity of implementing CBNRM would be improved by working together.

The empirical chapters in this thesis will present the experiences and lessons that we have learned during our rich and prolonged CBNRM exploratory journey.

3 Theoretical debates and analytical framework

Qiu Sun and Ronnie Vernooy

This thesis is about how CBNRM is understood and practised in rural Guizhou by a variety of social actors. We reflect on the questions of who are involved in CBNRM, in what ways, and in what ways relationships are forged (or not) that make CBNRM happen? What have been the outcomes of CBNRM practice? What efforts are made to institutionalize CBNRM? What are the factors that affect CBNRM scaling up? In previous chapters, we have presented the general background of China's transformation from a central-planned economy to a market-oriented economy. We have also discussed the emerging issues of natural resource management in rural China. Chapter 2 introduced the GAAS team and the CBNRM research implementation process in Guizhou. This chapter explores selected theoretical debates concerning community-based natural resource management and collective action for common-pool resource management. It then provides a rationale for considering these collective actions as they occur in practice, as institutions. We also address why and how their performance is affected and conditioned. Finally, the role of a change agency in promoting CBNRM - central in our efforts - is theoretically explored.

3.1 Natural resource dilemmas: interdependency, uncertainty and potential conflict

Natural resource degradation is of concern all over the world, especially in developing countries (MEA, 2005). However, the underlying causes of natural resource degradation vary because of the particular interplay of processes in different contexts, such as the expansion of resource extraction sectors (e.g., mining, forestry), industrialization and urbanization. Many natural resource management situations are characterized by a complex and changing web of interests and by struggles to deal with trade-offs between interacting sets of different stakeholders (Grimble & Wellard, 1997). Röling (2002) defines these situations as resource dilemmas, e.g., situations in which multiple stakeholders with different interests make competing claims on the same resource(s). Usually, the use of the resource by one stakeholder reduces the access to, or value of, the resource for others. So the stakeholders are highly interdependent, in space, in time, or both (Röling, 2002). In China, resource dilemmas are becoming more evident and in many regions conflicts have erupted over access, use and benefits related to water, land, and forests. We are concerned about these conflicts and their social and environmental consequences.
Traditional approaches that focus on technical innovations and free markets as dri-

ving forces for environmental management are considered insufficient or simply not workable to address the problem of resource dilemmas (Jiggins & Röing, 2000). As people have become the main force of environment changes, the key question to deal with (sometimes called the eco-challenge), is 'how we deal with ourselves' (Daniels & Walker, 1996; Röling, 2002). The traditional sciences and their focus on technical solutions, such as terracing sloping lands to control water and soil loss (see also chapter 2), can not solve the fundamental problem of natural resource degradation. This is so because the human dimension in natural resource management has become crucial for sustainable development. In 'The soft side of land', Röling (1997) suggests that natural resource systems encompass a 'hard' (or physical) ecosystem and also a 'soft' (or human) system. He stresses the importance of incorporating the 'soft' or human dimension in eco-system management (Röling, 1997; Woodhill & Röling, 1998).

Taking coastal zone management as example, Visser (2004) argues that a fisherman is not, as natural scientists or technologists have assumed, "an individual man on a boat who makes rational choices about the number of times he will go to sea, and the fish he expects to catch. In reality, the fisherman's decisions are influenced by his wife, members of extended families and village co-residents" (ibid: 27). It is therefore important to understand how people interrelate 'on the ground' in decision-making regarding natural resource use. Social data should not be seen as just supplementary to natural and technical data, but as central (Visser, 2004).

Obviously, people in their interrelations with each other and also with the eco-systems to which they are bound, vitally determine the direction or outcomes of eco-systems. Daniels and Walker (1996) argue that "uncertainty comes with even the best available sciences, because natural resource management questions are fundamentally ambiguous." As the outcomes of eco-systems are largely determined by human behaviours, actions and interactions, "no single part, agency, organization, or discipline holds the key to understanding a particular natural resource management situation. For any one party to assume that it 'knows best', 'understands fully', or 'has all the answers' is presumptuous." (Daniels & Walker, 1996)

Many of the contested natural resources are common-pool resources, i.e., those resources (i) for which joint use involves sub-tractability; that is: use by one user will subtract benefits from another user's enjoyment of the resource system, and (ii) for which exclusion of individuals or groups involves high transaction costs, and so it is difficult to control or restrict access to them (Ostrom, 1990; Steins, 1999). In this sense, a common-pool resource is a valued natural or human-made resource, such as a forest, an irrigation facility, or a grassland, that is available to more than one person and subject to degradation as a result of overuse in the absence of jointly agreed upon rules and regulations (or due to non-compliance with rules and regulations). Around the world, we observe that common-pool resources are easily overused, degraded, and even destroyed (Dietz, et al., 2002). Almost all environmental resources have attributes of common-pool resources, although this feature is not always easily recognized by all resource users. Some resources are simply indivisible (e.g.,

air), and some resource systems, like forests, contain or produce useful items that are themselves fugitive or mobile resources. In some large resource systems, particularly in arid regions, there is great uncertainty in the location from year to year of the most productive zones or resources.

Hardin's 'The tragedy of the commons' (1968) raised the interest of scientists in studying the commons. Still very relevant (although not without shortcomings), we briefly refer to his now famous article. The basic idea of the article is that natural resources when regarded as pure common property have the tendency to degenerate. People tend to over-use and under-invest or free-ride when resources belong to everyone. The solution proposed by Hardin was basically two-fold: the tragedy of the commons could be avoided only by privatization or via state control over resources. It has been observed that neither centrally controlled management nor fully privatized management for natural resources are successful (Ostrom 1990). The problem with centrally controlled management systems is that the state lacks sufficient manpower and means to manage natural resources. Monitoring of compliance with the rules is difficult or costly, standards and norms are difficult to define, and procedures are often sensitive to fraud. The problem with fully privatized management systems is that especially small (poor) farmers endure more risks, for example, losing their lands. For many poor farmers, land is the resource for their survival. Ostrom (ibid) pointed out that Hardin had in fact not been speaking so much of 'the commons' as of open access resources.

In real life, people are not always rational individuals driven purely by self-interests. People sometimes do cooperate to achieve common goals through communication, trust, and agreed rules. Many empirical studies have shown that people have the ability and interest to cooperate in common-pool resource management. But some studies do tell the story of Hardin's 'tragedy'. These studies have generated rich experiences and provided insights for successful common-pool resource management. Together, they have allowed to refining the conceptual framework for understanding natural resource dilemmas in a variety of contexts. Many cases confirm that local people are able to manage natural resource in a sustainable way via local institutions, although not without difficulties and struggles. These cases have demonstrated that, apart from the two options provided by Hardin - market and state, there is a 'third way', that is, self-governing institutions and forms of collective action by local people that can manage natural resources in a sustainable way (Agrawal, 2002; McKean, 2000; Ostrom, 1990; Pijnenburg, 2002). When these alternative forms are practised with some kind of state involvement, we speak of co-management. Tyler (2006b) discusses co-management and presents several successful cases from around the world. A common-property regime is considered most suitable for the management of common-pool resources (Agrawal, 1994; McKean, 2000; Ostrom, 1990). A common-property regime "is a property-rights arrangement in which a group of resource users shares rights and duties toward a resource" (McKean, 2000: 30). There is a growing interest around the world in adopting this community management practice. McKean (2000: 40) argues:

> "Creating a common-property regime is a way of substituting collective management rules -which function as imaginary fences and informal courts internal to the user group- for what is missing. It is cheaper in these circumstances, and it is within the power of a group of resource users to create. Common-property regimes can be particularly attractive in providing administrative efficiency when resource management rules can simply be grafted onto the functions of a pre-existing community organization. The property rights in a common-property regime can be very clearly specified, they are by definition exclusive to the co-owners (members of the user group), they are secure if they receive appropriate legal support from governments, and in some settings they are fully alienable."

It is important to distinguish between a common-property regime and an open access regime, because Hardin's use of the term 'commons' has led to confusion about the differences between common-property resources and open access resources. Ostrom has been one the leading researchers seeking to clarify the differences. In summary, "common property is not access open to all but access limited to a specific group of users who hold their rights in common" (McKean, 2000: 30). The efforts analysed in this thesis build on this understanding of common property, including co-management and the related conceptual reflections that have emerged.

3.2 Coordination and cooperation

The common-pool resource scholars have formulated the minimum conditions for good performance of self-governing institutions (Ostrom, 1990, 1992, 1999): (1) restriction of the group with access to the resource, (2) communication among its members, (3) agreed rules of access to the resource, and (4) agreed monitoring of use and sanctions of misuse. Gibbon, et al. (2004) also points out that to overcome resource dilemmas, cooperation among stakeholders is essential. Community ownership and thus collective enforcement of rules can be an efficient way to cope with the costs of monitoring, because sharing rights can help resource users get around problems of exclusion. They can monitor each other's use, and they can work together to monitor the entire resource system and protect it from invasions and abuse by persons outside of their group (Gibson, McKean, & Ostrom, 2000). McKean (2000: 32) has highlighted that "definitional clarity is a prerequisite for understanding how a group of individuals might share property rights and thus create a regime of common property rights."

Communication, coordination and cooperation are thus central to effective management. Examples can be found from a variety of natural resource management contexts, including grasslands (e.g., H. Ykhanbai & E. Bulgan, 2006), forests (e.g., O'Hara, 2006), fisheries (e.g., Tubtim, 2006), drinking water systems (Visscher, 2006; Van Wijk-Sijbesma, 2001) and irrigation systems (Khanal, 2003). Lam (1998)

has shown that, through a comparison of farmer-governed and government-managed irrigation systems, the former consistently outperform the latter. From this study, it is clear that (local) institutions matter -they are critical in the formation of social capital and indispensable to learning, and have profound impact on performance. A central issue is how individuals in an irrigation system work with one another to operate and maintain the system and how institutional arrangements and incentives are central to engage in collective action. In Lam's (1998: 1) own words:

> "Whether farmers are able to operate and maintain irrigation infrastructure effectively and receive an adequate and reliable water supply depends significantly upon the extent to which various irrigation institutional arrangements enable them to relate themselves to the physical world and to one another in a complementary manner. Thus, understanding and, hence, improving irrigation performance requires a better understanding of the ways that these institutional arrangements, combined with relevant physical, social, and cultural factors, impinge upon the actions and interactions of individuals pertaining to irrigation governance and management."

However, communication, coordination and cooperation are not a given. They imply building, strengthening, realigning, and sometimes, altering relationships. The challenge therefore is to avoid simplistic instrumentalist views on processes of change that are oriented towards achieving collective goals. This implies the need to be aware of power relations and politics, and continuous self-reflection on our roles as researchers and change agents and how these influence both process and outcomes (Nuijten, 2004).

3.3 New paradigms in environmental management

The work by Ostrom and others (including institutional economists, political ecologists, and anthropologists) has directed our attention to questions of interdependency, uncertainty, and complexity. In addition, it has generated renewed interest in coordination and cooperation, both cornerstones of collective action. Others have started to address similar issues, from other disciplinary backgrounds and theoretical perspectives, with a focus on participatory development and social learning. They share a common interest in joint action and learning processes and their outcomes in terms of natural resource management, poverty alleviation, and empowerment. Our work has also been inspired by these thinkers and practitioners, whose work in China remain relatively unknown, although in a number of places a considerable track-record does exist in terms of both participatory research and development practice and reflection, e.g., in Yunnan, Guangxi, and Guizhou, and at the College of Humanities and Development at China Agricultural University in Beijing, to name a few examples.

Participatory research and social learning for natural resource management

Participatory natural resource management research emphasizes the importance of multiple stakeholder analysis and involvement (a more detailed discussion of this theme in the context of our research site can be found in Chapter 5). Increasing concerns about the (mis)management of the natural resource base stimulated the development of such an approach in which both ecological and sociological aspects of resource dynamics are often addressed more at an aggregated level, such as, for example, a micro watershed, a watershed, or a (community) forest. It allows dealing more systematically with the dynamic and often complex interactions among components of a natural resources system or a production system, e.g., farming, fishing, forestry, herding, collecting edibles (Vernooy, et al., 2005).

Stakeholder involvement refers to the active and meaningful participation of small farmers, large farmers, entrepreneurs, local authorities, local groups, NGO staff and policy makers at different levels who together analyse problems and define research and development initiatives and work towards reconciling conflicting or diverging points of views and interests. In particular, the active involvement of NGOs, local governments, grassroots groups and farmer associations is now a feature in many, participatory, natural resource management research projects. Foremost, the aim is to learn from the women and men living in the rugged mountainous areas, desert margins, stressed coastal basins or other 'marginal' areas who are struggling to make a living under often very difficult conditions (Tyler, 2006a; Vernooy, et al., 2005).

Resource dilemmas can be overcome through interaction among stakeholders, to collectively negotiate a way forward (Gibbon, et al., 2004; Röling, 2002). This process is called by Röling (2002), 'social learning'. He defines social learning as the process by which multiple stakeholders with competing claims on a natural resource move towards, and engage in, concerted action at multiple scales of interaction. Simply, social learning is about the interactive way of getting things done in theatres with actors who are interdependent with respect to some contested natural resource (Röling, 2002). The process of establishing a common-property resource management regime (Gibbon, etc al., 2004), is an example of social learning in practice. When different actors interact in a way to agree upon the use of contested natural resources or ecological services, then we can say social learning has taken place in such a scenario.

For social learning to effectively take place, there has to be a process of interaction. Thus, "the interactive way of getting things done is based on conflict resolution, negotiated agreement, shared learning, convergence of goals, theories, and systems of monitoring, and concerted action" (Röling cited in Leeuwis & Pyburn, 2002: 12). Leeuwis and Pyburn (2002: 12) argue that social learning "stands in sharp contrast to instrumental use of technologies to control nature for assumed human purposes. It also stands in sharp contrast to economics, which ascribes people with reasons. Social learning is about a third and new way of getting things done through the convergence of reasons of interdependent stakeholders." Obviously, stakeholders' inter-

actions in social learning process need coordination for concerted action.
Through the process of social learning, new research questions are emerging concerning knowledge generation processes, power relations, the dynamics of change and adaptation and concerning research methodology and practice. Methodologically, there is an interest in broadening the spectrum of research by including innovative tools developed through participatory action by practitioners. Most importantly, local women farmers and fishers are joining as 'professional' researchers in a collaborative effort to analyse their situation and design-, try out and assess new practices. Conventional policies and research often have discounted the role of local people in designing and implementing measures, projects and programs.
Participatory research aims to involve the local men and women most directly linked to natural resource management. Often they are the poorest of the rural poor or belong to ethnic minorities (such as in the case of Guizhou province), which are politically and economically isolated. These men and women may have intimate knowledge of the local resource base but this does not mean that this knowledge is always 'perfect'. Experience has shown that often, local people are motivated to improve productivity if they can be assured of receiving benefits. Another central feature of participatory research approaches is the focus on the systematic integration of expertise in the natural sciences with social science perspectives on the interplay of community decision-making processes and supra-local institutional forces and contexts (Vernooy, et al., 2005).
In terms of outcomes, sustainability and equity are both important to the normative agenda adopted in this thesis. Resource sustainability refers to "the continuance (or even improvement) of the resource system, facility, or stock that generates the flow of resource units" (Dietz, et al., 2002:25). This definition focuses on the 'hard' aspects of a resource system. From a social science perspective, "sustainability is the outcome of the collective decision-making that arises from interaction among stakeholders" (Röling, 1998:7). In this sense, the definition of sustainability is one of the results that stakeholders have to work out in the process of interactions.
Participatory research experiences and outcomes are accumulating step by step. They have allowed the identification of a number of research action principles, which we present here as conclusions to this section Vernooy & Ashby, 1999: 257-259, see also Vernooy & McDougall 2003):

- Building and involving local organizations is a means of changing the ways in which local groups interact with each other and with the broader society aimed at amplifying the range of options of the less privileged, enhancing their involvement in policy making, providing space for more people to make their voices heard and for improving the quality of their participation.

- Natural resources are often used by a variety of direct and indirect users with different and sometimes opposing or conflicting views and interests. This is parti-

cularly true in the highly agro-ecologically diverse, complex and fragile environments such as can be found in Guizhou province and other regions in the west of China. To begin organizing for sustainable management, we must therefore identify these different 'voices' and be aware of the differentiated responses of people to change.

- Action research can contribute to the creation of 'fora' for analysis, discussion, and negotiation where ideas can be exchanged and (new) initiatives planned. This is why it is important to create (new) opportunities for meaningful participation. The building of trust is essential, but may take time and patience. These processes of organizing often imply struggles over the definition of (new) rules and norms.

- Local-level monitoring of resource use is required to ensure compliance and regulation. To achieve better resource management practices through cooperative actions, rules, and sanctions, local people and those cooperating with them must have a good understanding of the resource dynamics (e.g., soil dynamics, nutrient flow, and water cycles). Monitoring will help raise awareness among local decision makers about the interdependencies of resources and, if carried out collectively, can easily create ownership, skills, confidence, and credibility.

- Building linkages between local communities and the level of national institutions and policy makers helps local actors exert a demand for services and influence policy agendas. This includes the integration of government into the local planning process so that interests and concerns are taken into account, and the sourcing of technical assistance and expertise transfer.

Community-Based Natural Resource Management

The scientific research discussed above provided a fertile ground for an attempt to integrate the best of both 'worlds'. This has led to an approach know as community-based natural resource management or CBNRM (Tyler, 2006b). CBNRM approaches emerged and have become more popular over the last 30 years. They are the result of reflections on the failure of state controlled management and of privatized management of natural resources. State controlled management has been criticized as being (too) costly, inflexible, and not people centred. Many private management schemes have shortcoming because they are too oriented to economic development or too conservation focused while ignoring the diversity of resource users needs and interests that often go beyond pure economics or conservation.

The aim to integrate environmental protection and the improvement of the livelihood of local resource users lies at the core of a CBNRM approach. CBNRM takes local knowledge seriously, as a starting point and as an input in active and meaningful participation in decision-making. Local knowledge is essential if local users' needs and interests in natural resource use and management are to be addressed

and for creating or strengthening local institutions for sharing benefits and responsibilities more equably. Strengthening the capacity of stakeholders (learning by doing) and empowering local communities are key. Local actors are the starting point of CBNRM, and are considered primary stakeholders because natural resources remain a primary source of livelihood for local communities, although we acknowledge that non-rural resources also are becoming important for making a living.

There is a variety of views on community-based natural resource management. We discuss these briefly and then present our own understanding. CBNRM has been defined as a process by which local groups or communities organize themselves with varying degrees of outside support so as to apply their skills and knowledge to the care of natural resources and environment while satisfying livelihood needs (Pretty & Guijt, 1992). Little (1994) states that CBNRM focuses on community and positions it as the foundation for assessing natural resource uses, problems, trends and opportunities and for taking action to deal with adverse practices and dynamics. Uphoff (1998) emphasizes the following as the starting point of CBNRM: "The essential feature of CBNRM is starting with communities, taking them into confidence and having confidence in them. It engages their ideas, experience, values and capabilities on behalf of resource conservation objectives, at the same time it seeks ways for communities to become better remunerated and better served. It is prepared to accommodate local interests, needs and norms that are compatible with long-term preservation of ecosystems and their biological resources."

In our view (IDRC, 1997, 2000; Tyler, 2006a; Vernooy, et al., 2005), CBNRM research is characterized by basic elements such as attention to (more) complex natural and social systems (requiring an interdisciplinary approach and team-work), a longer time perspective, a diversity of social actors, a scale of analysis and interventions beyond the 'farm' unit, collective action and a preoccupation about common pool resources, a participatory action and social learning style, and a strong emphasis on empowerment and capacity building.

Conventional research often focuses on one particular resource (water, land or forest) with little thought about the access and use (i.e., social) systems that influence management practices; CBNRM focuses on the interactions among ecology, socio-economics and political elements. From a time duration perspective, conventional research often continues for one or two years, but CBNRM cannot usually deal with the complex questions in such a short period. It requires a longer-term development strategy. In conventional research, the main social actors are usually researchers and government. In CBNRM, the main social actors are the users of the resource(s), community people, local farmer/fisher/herder associations, researchers, NGO staff and government staff. Other social actors may also be involved, such as traders.

The learning style of conventional research is mostly a top-bottom approach with little thinking about empowerment and capacity building. CBNRM favours a multi-way learning process, especially using informal methods (encouraging peer-to-peer

learning). It aims to empower people by strengthening their own knowledge and capacities and farmer/fisher/herder organizations. But the C of 'community' in CBNRM should not be taken as homogeneous and static. The 'C' points more to the perspective: from the local 'out' and 'upwards' to encompass processes and structures beyond localities more restricted in time and space. 'Community' is taken to be constituted in relationships constructed in interdependence rather than assumed as a state of social harmony or equity. Representation of 'community interests' and knowledge are often produced in the context of struggles over resources through which different parties defend interests and advance claims. Power differences between different community groups and between the community and outside groups influence interaction and negotiation between them and can influence whose interests are represented in the research.

Participatory processes provide an opportunity for less-powerful groups to contest existing power relations and resource rights but also may enable more powerful or politically aware groups to assert preferential rights over resources. Here it is important to consider whether the government is supportive of participatory processes. It is often especially important to be aware of the differences in social power and resource rights between men and women, that is, to specifically incorporate gender analysis into the research process. Gender encompasses the socially constructed roles and characteristics assigned to men and women in a specific culture (Fajber & Vernooy, 2006). Social and gender analysis are key for understanding and addressing difference and for managing the inequalities that may exist within communities with respect to resource access, use or benefit sharing.

CBNRM is informed by a participatory research methodology. It is important to stress that participation can take a variety of different forms in terms of who participates, how and when, and who decides about what, how and when. In any given participatory research activity, usually more than one form is employed, either consciously or unconsciously. Consultative forms of participation mean that researchers only consult with others (e.g., farmers) in order to make decisions about (community) needs and to design research interventions (Biggs & Farrington, 1990). Collegial forms imply the active involvement and equal decision making power of others in conducting the whole research process (from identification of the research problem or opportunity to final assessment) (ibid.), such as the involvement of communities and user groups in decision making about new management rules and regulations (e.g., an irrigation system or a community forest) or multi-stakeholder groups/associations developing management policies covering various scales of resource management (e.g., a watershed).

3.4 Institutions and organizations

CBNRM in practice requires understanding natural resource dynamics (agro-ecological processes) and how people intervene in these dynamics in more or less orga-

nized ways. This brings us to crucial importance of institutions and forms of organization.

Institutions, according to North (1990: 3) are "set of rules and norms that constrain human action." Uphoff (1995: 184) defines them as "complexes of norms and behaviour that persist over time by serving collectively valued purposes." And Young (1994: 3) see them as "sets of rules, decision-making procedures, and programs that define social practices, assign roles to the participants in these practices, and guide interactions among occupants of individual roles." Scott (1995: 33) following Young, defining them as "cognitive, normative, and regulative structures and activities that provide stability and meaning to social behaviour." In summary, we could say that institutions are the guidelines for interactions, the rules of the game. Based on the above definitions, and with regard to common-pool resources, this research refers to community-based institution as sets of rules, decision-making arrangements and norms defined by community members about who has access to a resource; what can be harvested from it; and who participates in key decisions about these issues. (Varughese, 2000) investigated the role of local institutions in 18 cases in the Middle Hills of Nepal. He finds that those communities that have a higher level of instutionalization regarding the forest - as measured by the presence of institutional arrangements, such as monitoring assignments and restriction on entry and harvesting - tend to have forests in better condition.

Gibson, et al. (2000: 4) has stressed the everyday relevance of institutions:

> "Local institutions can modify the effect of factors thought to be the driving forces of deforestation. Rare is the market, technological, demographic, or political factor that affects individuals without first being filtered by local institutions. Given certain institutional arrangements, individuals may forego the use of a resource if it is not cultural acceptable. Individuals may ignore central government rules that contradict their daily patterns of resource use or ask the central government for help in protecting their resource. Individuals may construct rules to prevent the immediate commoditisation of their forest resource or they may allow the resource to be put on the market quickly. Since local institutions guide the daily consumption of natural resources, it is appropriate to keep them at the centre of analyses concerning forest use."

Giddens (1989) conceptualizes organization as a social grouping of users involving a definite set of authority relations who meet regularly, may not have intimate ties with each other and normally come together for a specific practical purpose. More simply put, an organization is a structure of recognized and accepted roles (Uphoff, 1995). Community organizations in this research refer to the villager groups related to natural resource management. They can include women collective grazing group, water users association, village forest management group and village development committees.

We quote to some length (Uphoff, 2001: 16), explaining the conceptual links and overlaps between these two key concepts:

> "Organizations may or may not have institutional status, i.e., widespread respect, support, cooperation, etc.... An organization like a local branch of a bank is not an institution, even if the parent bank of which it is a part has become an institution, a bank branch functions as an organization, without any sense of permanence and without any broad social appreciation and support. It can disappear without anyone caring except those persons directly affected (employees, depositors), whereas the demise of a bank that enjoys institutional status has broad repercussions, social and psychological, not just financial... Institutions are a category that overlaps with organizations; some institutions, such as the Central Bank, are also organizations, while other institutions, like money, are not... In many cases, there is overlap, where institutions are also organizations, and vice versa, certain organizations qualify also as institutions. For the purpose of understanding how to achieve or ensure sustainable development, we should recognize that organizations that have acquired a degree of institutional standing will have more capacity to get cooperation and achieve their goals because of the legitimacy and status that they have acquired in the minds of many... The resources of legitimacy and status that they receive from the public are not material and are not tangible; but they have many concrete effects on the ability of actors in organizational or institutional roles to get objectives realized."

3.5 Performance

The outcomes or performance of CBNRM can be assessed along three interrelated dimensions: productivity, sustainability, and equity. According to (Conway, 1994), who used these dimensions to discuss sustainability in agricultural development, these three dimensions do not add up because they are non-equivalent. Hence, trade-offs are required, and policies should spell these out clearly. But perhaps a middle ground can be reached by avoiding zero-sum reasoning and by also appreciating the achievements to be produced in the processes of organizing itself.
According to a study by Agrawal (2005) on forest village councils in India, councils that had larger membership were more easily organized for collective action than those with smaller membership. The said study helps to draw a distinction in terms of mobilizing group for collective actions and success in meeting the objectives of collective action. On the other hand, Ostrom drew lessons on how to design institutions that work to overcome 'the tragedy of commons' -the dilemma of collective actions leads to threats of common-pool resource states. As Arturo Israel (cited in Putnam 1994:10) has remarked: it is easier to build a road than to build an organization to maintain that road.

Pavir and Deshmukh (2003) have pointed out that to account for variations in performance, attention must be paid to assessing the ability of a regime to respond to dynamic local conditions. Do rules and rights over use accommodate to shifting local priorities? Do institutions reflect the varied histories of resource users and deal with divisive local contexts and plural interest when we design impartial access regimes? They go on to argue that there is a need to consider the spatio-temporal conditions that underlay success across institutional settings. This is especially the case when resources have multiple users and uses (as so often is the case, including in our work), and where management is complex and fraught with difficult implications for long-term ecological sustainability.

A livelihoods framework is used in this thesis to assess performance. The sustainable livelihoods framework (Carney, 2002; Chambers & Conway, 1991) is a tool for improving our understanding of the dynamics of people's livelihoods. It presents a number of key factors that affect people's livelihoods, including six kinds of assets that people can hold, and the relationships among these. The framework, when used in a flexible and dynamic way (i.e., not as a blueprint), is also useful as an assessment tool (Haan, et al., 2002). The focus on livelihoods parallels our CBNRM approach by highlighting the importance both of natural assets (e.g., land, forests, water) and social assets (e.g., capacities for coordination and cooperation). In addition, the framework identifies contextual factors, and emphasizes the mediating role that institutions play in facilitating access to assets and thus in influencing the livelihood strategies adopted by different people. The framework provides a broad spectrum of possible livelihood outcomes, encompassing the sustainable use of the natural resource base, food security and income, and human wellbeing. It has, however, been criticised for leading to rather static analyses and for failing to examine asset functioning (Dorward, et al., 2001). Sustainable here refers to the maintenance or enhancement of resource productivity on a long-term basis. The key conceptual elements of the livelihood framework are (DFID, 1999):

- *People-centred*
  fully involving people in developing their own definitions of poverty and goals for achievement;

- *Holistic*
  Recognizing the multiplicity of influences, actors, strategies, and outcomes;

- *Dynamic*
  Recognizing that livelihoods, institutions, and conditions are always changing;

- *Building on strengths*
  Focusing on strengths, capabilities, social networks, and the like as opposed to needs and weaknesses;

- *Macro-micro links*
  Bridging the local and the national levels and recognizing that macro level policy can support community efforts and that lessons learned at the micro level can inform macro level policy; and

- *Sustainability*
  Livelihoods are considered sustainable when resilient to external shocks, not dependent upon external sources (or if are, then the institutions and processes in place are sustainable), can maintain long-term productivity of natural resources, and do not undermine or compromise other livelihood options (i.e. social equity). Sustainability is viewed as social, environmental, economic, and institutional.

The framework is illustrated below: it links vulnerability, livelihood assets and capabilities, structures and processes of communities, and the resultant livelihood strategies and outcomes.

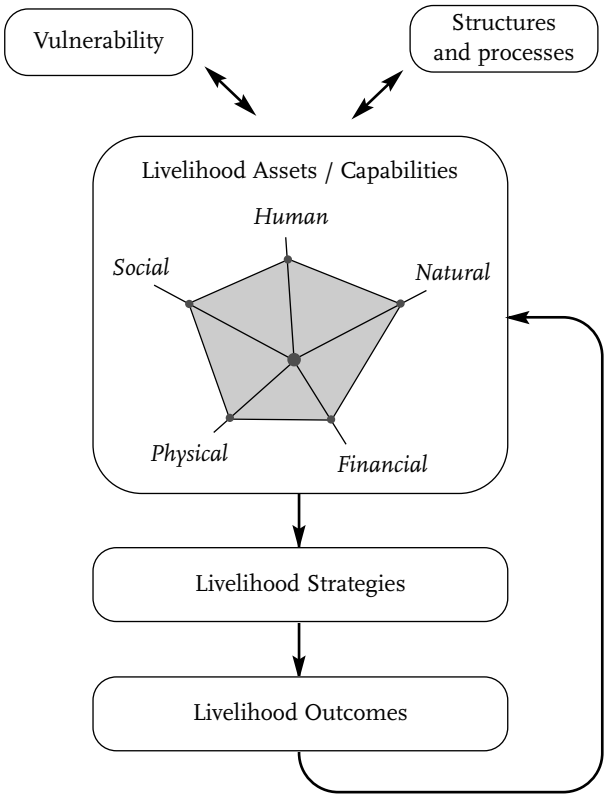

FIGURE 3.1 Sustainable Livelihoods Framework (Source: adapted from DFID, 2000).

Scoones (1998:7) argues "the ability to pursue different livelihood strategies is dependent on the basic material and social, tangible and intangible assets that people have in their possession. Drawing on an economic metaphor, such livelihood resources are seen as the 'capital' base from which different productive streams are derived from which livelihoods are constructed." The sustainable rural livelihood (SRL) framework suggests that livelihoods comprise five basic capital assets that serve different functions in satisfying basic needs (Carney, 1998). They are:

- Natural capital: various natural resources or processes that can be used for food, wood, clean water
- Social capital: trust, reciprocity and obligation, norms and sanctions that encourage people working together
- Human capital: related to individual capability, health, nutrition, education, skills and knowledge
- Physical capital: for example, local infrastructure, road and irrigation systems farm machines
- Financial capital: for example, savings, credit and subsidies.

In order to create livelihoods, therefore, people need to combine the 'capital' endowments that they have access to and control over (Scoones 1998).

3.6 Beyond the local: scaling up

CBNRM focuses on the local but with an eye for how the local connects (or does no longer connect) to beyond-local socio-economic and political dynamics. From an action research point of view, this implies a concern for supra-local forces and how they influence the scope for change and innovation at the community level, as well as a motivation to expand the impacts of local innovations in natural resource management to a larger area. Local innovations are often facilitated and promoted by NGOs or research institutes, with financial support from international donors. In many cases, they are limited to diverse and separate projects or programs. Giving this fact, these local innovations are like 'scattered successful islands'. The effort to move beyond scattered islands is known as scaling-up. In Chapter 8, we will present a more detailed discussion of our understanding of scaling-up and how we have tried and are trying to practice it in our research site and beyond. Here we only present a summary of some of the main elements that appear most frequently in the literature.

The relevant literature offers varied perspectives of, and thus different strategies for

scaling-up. Generally, scaling-up is about an expansion that has a cumulative impact (Blackburn & Holland, 1998). More concretely, we scale up when we bring "more quality benefits to more people over a wider geographical area more quickly, more equitably and more lastingly" (IIRR, 2000). This definition stresses the importance of sustainability, equity, and time efficiency and highlights a people-centred vision to scaling-up (Gündel, et al., 2001). However, this definition only emphasizes the 'end' of scaling-up. For other scholars, scaling-up itself is also a learning process, i.e., a 'means' of "promoting local-level innovation, understanding why local innovations work in specific contexts, and reflecting on their relevance in other geographical and social contexts" (Carter & Currie-Alder, 2006). Another dimension of scaling-up is linking local innovations to policy making, a facilitating process of institutional change in government bureaucracies (Hagmann, et al., 1998; Samaranayake, 1998; Thompson, 1995), a way of "building institutional capacity in the community for promoting and sustaining the innovation and adoption process" (Franzel, et al., 2001). Building on our discussion so far in this chapter, we favour a broad definition of scaling up that includes the 'learning how to change institutions' and policy dimensions.

The terms of 'horizontal' and 'vertical' scaling-up are used to refer to the different dimensions of expanding impacts of local level efforts. Vertical scaling-up is expansion to other (stakeholder) groups. It is institutional in nature and involves people from grassroots organizations to policy-makers, donors, development institutions and international investors. Horizontal scaling-up is the geographical spread and expansion to more people and communities within the same stakeholder group (IIRR, 2000). However, researchers argue that the processes of horizontal and vertical scaling-up have to be linked in order to achieve sustainable impact. In reality (and as our own practice in Guizhou demonstrates), vertical and horizontal scaling-up are interrelated. As Lobo, (1996: 9) suggests:

> "Up-scaling individual success stories to a larger scale calls for a perspective of macro-management which at the same time has to be rooted in and be responsive to the micro-level. Unless there is a continuous and enabling co-operation between the key sectors and actors, such a process would be bound to get unstuck, thus seriously jeopardizing sustainability as well as replicability."

Kar and Phillips (1998) analyzed the experience of institutionalizing participatory approaches in the design and implementation of slum-improvement projects in India. They conclude: "...for scaling-up to be effective, scaling-down may first be necessary be concentrating on a handful of cases of sustained community action in which participatory approached play an important part, and using such cases as learning laboratories." In our work, we are combining horizontal and vertical scaling up efforts, as analysed in Chapter 8.

3.7 Facilitation in action research: the role of a change agency

Learning to take collective action or social learning is a key concept in CBNRM and other participatory approaches (Groot & Maarleveld, 2000; Groot, 2002; Röling, 2002; Röling & Jiggins, 1998). At the heart of CBNRM and participatory (action) research is learning by doing together. This means that building or strengthening partnerships between individuals or groups that are characterized by mutual cooperation and responsibility for the achievement of a specified goal, is essential. In our work, research partnerships refer to the agreed and planned forms of co-operation between stakeholders of local communities, government agencies and research institutes regarding natural resource management and community development. This is easier said than done, as this thesis demonstrates. It requires a new way of doing research that goes further and deeper than the mere collection of information for the purpose of writing a report and sending this report off to higher authorities for their consideration and possible action. In China mainstream research is still characterized by such a way of doing things but we have come to appreciate that a researcher can be useful in other ways as well. One of the most important new roles that we have come to play is that of facilitator. In the last section of this chapter, we briefly discuss this new role.

As mentioned earlier in the chapter, natural resource management often involves more than one group of resource users. They do not always share same goal, values, perceptions, opinions, knowledge and rights (or obligations) regarding the same resource management issue. According to (Röling, 2002), learning emerges from human interaction during which people's different goals, values, perceptions and knowledge are understood and conflicting interests in natural resource management are accommodated. By this process of interaction, concerted action can be taken by the involved stakeholders to tackle a shared problem in natural resource management. Facilitating learning, in this sense, is to actively involve multiple stakeholders to transform an arena of struggling individuals into a forum for active social learning towards effective action (Groot & Maarleveld, 2000). Reflection on this learning process "leads to a deeper understanding about how complex issues work and why. It improves people's capacity to make sense of and adapt to an ever-changing world. Compared to learning through adopting externally-provided solutions, this active learning is supposed to promote sustainability, creativity and innovation."(ibid: 6)

Some researchers and practitioners use system thinking to guide their facilitation in multiple stakeholder processes (Checkland, 1989; King & Jiggins, 2002; Röling & Jiggins, 1998; Wilson & Morren, 1990). Facilitators who adopt system thinking and practices recognize the interdependence of stakeholders and the complexity of interrelationships and uncertainty of interaction outcomes that are the emergent properties of dynamic learning processes. In the line of system thinking, Groot and Maarleveld (2000) point out that in system models, stakeholder groups are situated in different subsystems according to their influence and involvement in a situation.

They order stakeholder groups into three subsystems, e.g., (i) first order subsystem actors: the ones who are directly affected or are affected by decision making and who are locally present, like farmers, extension workers, etc.; (ii) second order subsystem actors: the ones who have relatively lower interest in the issue at stake and/or are not locally present (like banks, farmer organizations outside a project area); (iii) third order subsystem actors: the ones who represent the administrative, political and other influential actors at the higher level (like donors).
These subsystems of actors are 'nested' in larger systems. Thus, the first order system forms part of a wider environment or is nested in a second order system composed of second order actors. And the second order subsystem is nested in a third order subsystem. They argue that (ibid: 10):

> "Each subsystem is distinct from others in terms of different units of actors with different learning needs due to different positions, roles, experience or rights. Facilitation in participatory interventions can catalyse the learning of actors operating in the same or different subsystems to achieve desired outcomes... Activities are needed to facilitate interactions between different order actors to learn from each other, to accommodate/ consolidate objectives and strategies."

In the same line of thought, Jiggins & Collins (2004) further emphasize that in order to achieve co-ordinated or concerted action among stakeholders, facilitation must go beyond fostering interactions between different categories of stakeholders to learn from each other. Facilitation should also involve understanding the dynamics of stakeholder (power) relations within the same subsystem and dynamics of changing roles of stakeholders across subsystems so that social learning can be active and effective.
Leeuwis (2004:163) assumes conflicts are likely to emerge when different actors and stakeholders are involved in a collective process of meaningful change (such as innovation for resource management, community development or technology design) because such changes may have consequences that affect the values and interests of many stakeholders. He remarks that many researches have shown that conventional participatory and interactive approaches produce disappointing results because of "an inability to either resolve or use productively conflicts of interest that tend to emerge during the innovation process (Leeuwis, 2004). This draws our attention to the importance in innovation processes of negotiations to resolve emerging conflicts. The challenge then is to organize our participatory practices along the lines of a negotiation process, in which special attention is paid to the facilitation of social learning. Facilitation for Leeuwis (ibid) is therefore basically about conflict management through social learning in negotiation processes.
In order for this to happen it is fundamental that there are institutional spaces in which stakeholders may negotiate and use the results. The space is constituted in legal, political or bureaucratic concerns. However, when existing institutions sur-

rounding an integrative negotiation process are unwilling or unable to incorporate innovative solutions agreed upon by the stakeholders involved in the process (and this happens often as our own experience demonstrates), one may have "to fight, lobby and campaign first in order to increase the institutional space for innovation." (ibid: 171). In this sense, facilitation also involves advocating for policy spaces and spaces for institutional interactions.
We summarize the different tasks implied in facilitation in Box 3.1.

Task 1: Preparing the process
- Preliminary exploratory analysis of conflicts, problems, social (including power) relations, practices, etc. in historical perspective;
- Selecting participants;
- Securing participation by stakeholders;
- Establishing relations with the wider policy environment.

Task 2: Reaching and maintaining process agreements
- Creating an agreed-upon code of conduct and provisional agenda;
- Preliminary establishment of an overall objective/terms of reference;
- Provisional distribution of facilitation tasks;
- Definition of the role of eternal facilitators and other outsiders;
- Maintaining process agreements;
- Securing new process agreements as the process unfolds.

Task 3: Joint exploration and situation analysis (social learning A)
- Supporting group formation and group dynamics;
- Exchanging perspectives, interests, goals;
- Further analysis of conflicts, problems and interrelations;
- Integration of visions into new problem definitions;
- Preliminary identification of alternative solutions and win-win strategies;
- Identification of knowledge conflicts and gaps in insight.

Task 4: Joint fact-finding and uncertainty reduction (social learning B)
- Developing and implementing action-plans to fill knowledge gaps and/or to build commonly agreed upon knowledge and trust.

Task 5: Forging agreement
- Supporting manoeuvre: clarifying positions and claims, use of pressure to secure concessions, create and resolve impasses;
- Soliciting proposals and counter-proposals;
- Securing an agreement on a coherent package of measures and action plans.

Task 6: Communication of representatives with constituencies
- Transferring the learning process;
- 'Ratification' of agreement by constituencies.

Task7: Co-ordinated action
- Implementing the agreements made;
- Monitoring implementation;
- Creating contexts of renegotiation

BOX 3.1 Facilitation tasks in integrative negotiation (Source: Leeuwis, 2004: 170)

We can improve facilitation by the regular monitoring and evaluation of stakeholders' efforts. Monitoring is the systematic, regular collection and occasional analysis of information to identify and possibly measure changes over a period of time. Evaluation is the analysis of the effectiveness and direction of an activity or research project and involves making a judgement about progress and impact. The main differences between monitoring and evaluation are the timing and frequency of observations and the types of questions asked. However, when monitoring and evaluation are integrated into a research strategy as a project management tool, the line between the two becomes rather blurred. The deliberate and careful integration into the project cycle of monitoring and evaluation activities can strengthen the learning, accountability and effectiveness of shared research efforts. Using a participatory approach to do so facilitate the realization that what matters is not only what is assessed, but who does the measuring and assessing and whose criteria are used. In addition, such an approach can contribute to a better understanding of how different concerns and interests are represented and negotiated in a research process. In other words, it helps to understand and assess how and why participation takes places or does not take place.

3.8 Analytical framework

We develop from this theoretical discussion an analytical framework to illustrate the key concepts involved in this study and the relationships among them.

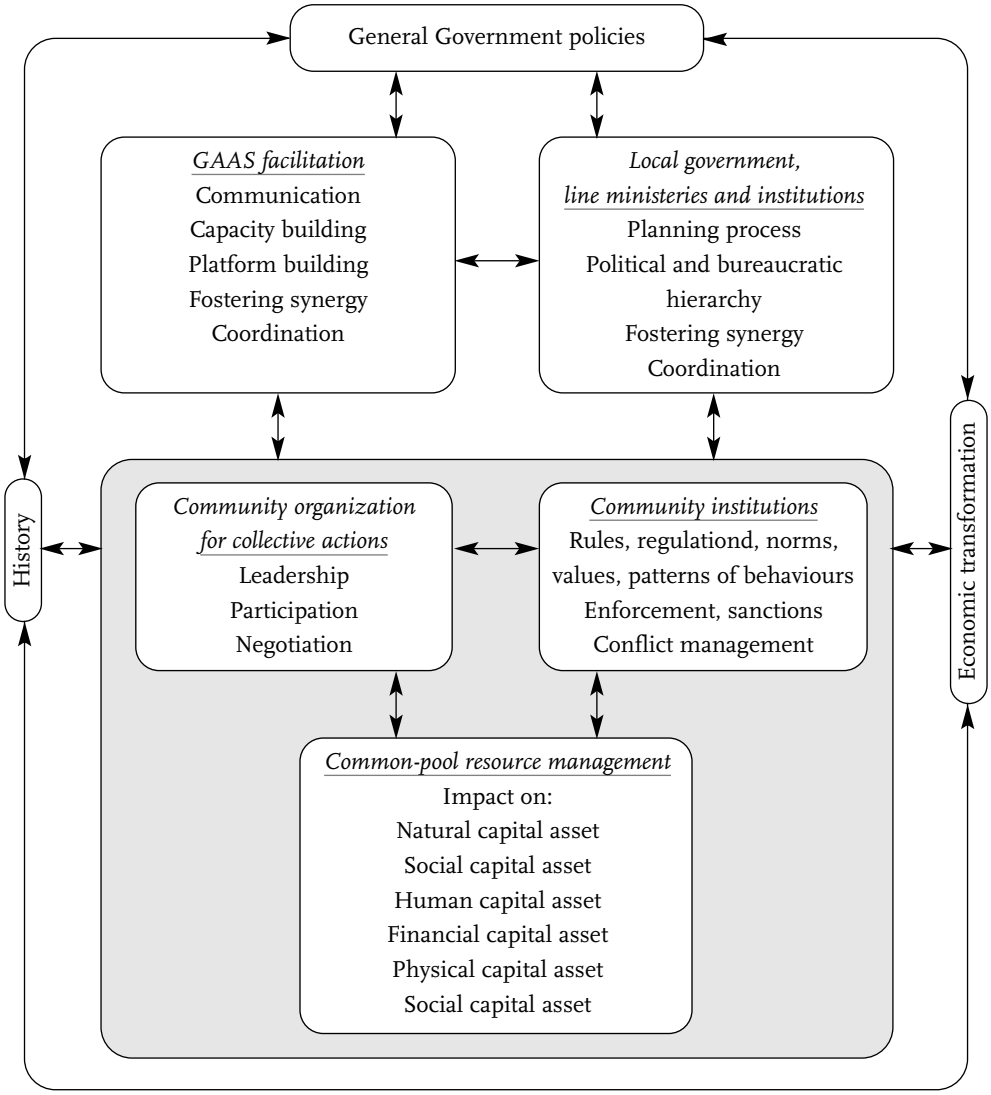

FIGURE 3.2 Analytical framework (Source: This thesis).

3.9 Research questions

The research questions of this thesis are derived from the analytic framework presented in Figure 3.2. The central research question is how CBNRM promotes (new) community institutions for collective action in common-pool resource management. Collateral questions are: how these community institutions and the results they produce (what we could call performance) are shaped and conditioned by both internal and external factors; and how these local institutional innovations link to policy-making.

Five empirical research questions are derived from the central question, which are:

(1) How were natural resources managed in rural Guizhou before and under the central-planned economy regime, and how are they managed currently under the market-oriented economy regime? What were/are the outcomes for the resources and lives of local people? In one sentence: how, over the last 50 years, have resource property arrangements affected the way local people manage natural resources in rural China?

(2) Who are the main stakeholders in natural resource management? What are their interests or stakes in resource use and management? What are the dynamics when stakeholders pursue their stake-holding in collective resource management?

(3) What are the effects of the GAAS team's CBNRM action research on community institution building for sustainable natural resources management?

(4) What is the performance of (new) community institutions for common-pool resources, in terms of changes in natural capital, social capital, physical capital, human capital and financial capital of local resource users?

(5) How does the GAAS team scale-up CBNRM to link local innovations to policy-making? What are the outcomes and key lessons learned?

4 Research design and methodology

This chapter presents the research design and methods used for data collection and analysis. The chapter also explains why these methods are appropriate for this research, and describes how the methods were applied in the field. The last part of the chapter explains the multiple roles of the author during the research.

4.1 Overview of the research design

This study aims to explore how CBNRM worked in rural Guizhou of China and to explain why it worked like that. To achieve this objective, knowledge was required on how CBNRM was understood and practised, who was involved in and who were affected by the CBNRM activities, what were the outcomes of the CBNRM action research in terms of natural resource management and people's livelihood, and under what conditions. It is obvious that a single method could not generate sufficient knowledge for this study. The methodology applied here was made up of a combination of anthropological and rural development sociological methods, and, to a lesser extent, some tools from ecology. The comprehensive methodology integrates social and natural sciences knowledge and skills; applies a long-term perspective; and relies on a long-term, direct and personal involvement. Secondary data from official (government) documents, project reports, and meeting minutes were supplementary sources of information. The use of multiple sources for answering each research question adds to the validity of the study (see Table 4.1).

4.2 Main research strategies and methods

Historical review

During the last 50 years, China has experienced several radical changes in natural resource property regime. CBNRM advocates common property rights or community-based, collective ownership. Therefore, in order to explore how CBNRM works in rural China, and to find out how research could contribute to transforming open access resources to collectively managed resources, it is important to understand the shifts of resource property regimes over the last 50 years (since the beginning of the communist government) and how the different regimes affected the way people use and manage natural resources, specifically forest, grassland and water resources. This study uses a historical review to analyse the institutional arrangements and their impacts on natural resources and rural people's lives for subsequent property regimes, with the emphasis on the Household Contract Responsibility System.
The information was generated from literature, field interviews and group discussions.

Main research questions	*Research strategies*	*Methods and data sources*
(1) How have resource property arrangements affected the way local people manage natural resources in rural China over the last 50 years?	• Historical review • Content analysis • Case study (Chapters 2 and 6)	• Key informant interview • Focus group discussion • Secondary data collection
(2) Who are the main stakeholders in natural resource management? What are their interests or stakes in resource use and management? What are the dynamics when stakeholders pursue their stake-holding in collective resource management?	• Stakeholder analysis • Mini case study (Chapter 5)	• Key informant interview • Participant observation • Secondary data collection • Field notes • The GAAS team reports and documents
(3) What are the effects of the GAAS team's CBNRM action research on community institution building for sustainable natural resources management?	• In depth case study • Action research (Chapter 6)	• Key informant interview • Participant observation • Focus group discussion • Secondary data collection • Content analysis • Field notes
(4) What is the performance of (new) community institutions for common-pool resources, in terms of changes in natural capital, social capital, physical capital, human capital and financial capital of local resource users?	• Comparative study • Statistical analysis • Survey (Chapter 7)	• Household interview • Statistical tests (factor analysis and T-test) • Quick scan on community resource management • Scientific survey for forests and grasslands
(5) How does the GAAS team scale-up CBNRM to link local innovations to policy-making? What are the outcomes and key lessons learned?	• Case study • Action research (Chapter 8)	• Key informant interview • Focus group discussion • Secondary data collection • Critical event analysis • Field notes

TABLE 4.1 Summary of research strategies and methods used for main research questions. (Source: This thesis)

Stakeholder analysis

Stakeholder analysis is "a holistic approach or procedure for gaining an understanding of a system, and assessing the impact of changes to that system, by means of identifying the key actors or stakeholders and assessing their respective interest in the system" (Grimble & Wellard, 1997: 175). It has been developed in response to the challenge of multiple interests and objectives, and particularly the search for efficient, equitable and environmentally sustainable development strategies (ibid).

"Stakeholder analysis has emerged as an important research tool with the appearance of participatory collective initiatives in natural resource management that have labelled participants in resource management as 'stakeholders' (Simoungwe 2006: 102). Stakeholder analyses are normally carried out at the beginning of participatory research to "make more precise the selection of who might be invited to participate in the research; to reveal the different stakes in, interests/preferences of, and drivers affecting the behaviours of the different stakeholders; to indicate potential conflicts of interest or power that might require negotiation, mediation or conflict resolution; to simulate creative thinking about the kinds of 'learning events' and 'participatory actions' that will help stakeholders to contribute constructively, and to stimulate creative thinking about scenarios of futures possible, and/or desirable" (Jiggins & Collins, 2004: 9). Within the framework of participatory collective management of natural resources, stakeholder analysis is used as a tool for analysis, project management, and empowerment of the marginalized stakeholders.

The GAAS-led CBNRM research project attempted to promote active participation of local resource users (the poor farmers) in decision-making and collective actions for sustainable, equitable and effective natural resource management. The poor farmers were relatively powerless compared with other stakeholders, and their concerns and needs were normally ignored. CBNRM action research was therefore about balancing power among stakeholders.

Stakeholder analysis, in this study, was used to assess the CBNRM research project from a multiple stakeholder perspective, to understand how CBNRM changed the pattern of relationship among stakeholders, especially to what extent CBNRM rebalanced the interests and power relations between different resource users, making collective actions possible for sustainable, equitable and effective natural resource management. Based on these understandings, this study analysed the strengths, weaknesses, opportunities and constraints of CBNRM. Stakeholder analysis was done in the context of case studies. Four mini-cases on multiple claims of different stakeholders for stake-holing in grassland, water resources, and the Xiaozhai mill house were used to identify the stakeholders and their stakes, explore the dynamics of relationships among stakeholders when they pursued their stake-holding in the resource under consideration, and to analyse the changes in stakeholder relationships brought about by CBNRM interventions.

The data were generated from interviewing, participant observation, reviewing the project documents, reports, and my personal field notes.

Case study

Case study is a research strategy involving an in-depth, longitudinal examination of a single instance or event: a case (Yin, 1984). It provides a systematic way of looking at events, collecting data, analyzing information, and reporting the results. As a result, the researcher may gain a sharpened understanding of why the instance happened as it did, and what might become important to look at more extensively in future research. According to Yin (1984), case study is a suitable research strategy

when a 'how' or 'why' question is being asked about a contemporary set of events, over which the investigator has little or no control.

Dabuyang case study
I took Dabuyang village as the case to explore deeply how CBNRM was interpreted and practised on the real ground, how CBNRM initiative developed community institutions for collective actions in natural resource management, and how these institutions performed and why.
Dabuyang was selected because it was involved in the CBNRM project for more than 10 years since 1995, and provides an opportunity to look at changes over time in the way people manage their resources and the impacts of the changes on the natural resources, people's livelihoods and the community structure. It also provides an opportunity to see how organized farmers and (new) local institutions interacted with outside actors, such as private business people, township government and the line ministries of the county. The GAAS team has been working intensively in Dabuyang to facilitate the organization of the farmers for self-governance of their community affairs and of the natural resources on which their livelihoods heavily rely. Thus, the case study in Dabuyang also explored the facilitation role of the GAAS team in order to explain how their intervention works and why.
The data were mainly generated from interviewing, participant observation, reviewing of documents, reports, meeting minutes, and my personal field notes.

Scaling up case study
I took the Animal Bank initiative in four villages as multiple cases to explore how the GAAS team facilitated the Kaizuo township government to apply a CBNRM approach in more villages in the township, and analyse factors that affected CBNRM scaling out. Then I took each of the GAAS team's practices of cooperation of with the four line ministries of Changshun county to promote a CBNRM approach in their programs or projects as cases of vertical scaling up. These cases serve to explore the processes and outcomes of CBNRM scaling up in the government line ministries, and to analyse the opportunities and constraints of CBNRM institutionalization in China. The data were mainly generated from interviews, participant observation, action research, project reports, documents, and field notes.

Action research
During July 2004 - September 2006, when I did my fieldwork for my PhD study in the CBNRM project site, I also worked there as a key project implementer, a role which I elaborate in Section 4.3 of this chapter. In many cases, my observations and findings from fieldwork were shared with my fellow researchers and influenced the next steps of the team's CBNRM action research. Based on the definition of action research, which was given in Chapter I, my PhD research did not only seek to develop understanding of my research questions, but also to intervene in the CBNRM learning processes. At the same time, the interventions and outcomes of the

CBNRM research also enriched my research findings. The field notes I took for my own research and for the (larger) CBNRM research initiative were shared and used for both purposes. For instance, the information about grassland management generated from the field interviews and observations became the evidence for the GAAS team to advocate changes in the grassland policy. The outcome of the policy advocacy, of course, was evidence for me to analyse the opportunities and constraints of CBNRM adaptation in China.

Comparative study of eight villages

To assess the performance of (new) community institutions for common-pool resources, in terms of changes in natural capital, social capital, physical capital, human capital and financial capital of local resource users, a comparative study was adopted and carried out during July-September 2006. For this study, eight villages were selected on purpose from 37 villages in Kaizuo Township, based on the criteria: (1) Different time-span of having been involved in the CBNRM project: since 1995, 1998, 2001 and not having been involved (control); (2) Success or failure in CBNRM practice. 25 households were randomly selected from each of the eight villages, for a total of 200 households. This study used the DfID livelihoods framework (see Chapter 3) to assess the impact of community institutions on livelihoods of the rural resource users. The indicators were developed for each capital asset based on a literature review and the experience of working in the project site over a long time. The term 'indicator' refers to factors that can be used to best describe each of the five capital assets. Before the formal household interviews, the identified indicators were pre-tested with farmers and then readjusted.

A total of five researchers carried out the interviews: two GAAS team researchers and three non-GAAS team researchers. Among the three non-GAAS team researchers, one was from another project team of GAAS and two were newly graduated university students who were working as volunteers/interns in GAAS (supported by a Non-Profit Organization in China). One of these two volunteers graduated in rural development at Chinese Agriculture University and another one graduated in sociology at Yunnan University. The purpose of involving the non-GAAS team researchers and the volunteers in the interviews was to avoid or limit the possible bias of the GAAS team researchers.

The face-to-face interviews were carried out household by household and from village to village during June-August 2006. The survey enumerators individually contacted the identified interviewees and obtained their responses in face-to-face interviews using a pre-tested questionnaire. Farmers were requested to score indicators in relation to their availability by allocating scores between 0-10 (0: no access, 10: full access) for 1995 and 2006. Interviewees were also asked to indicate the most important reason for scoring differently for 1995 and 2006. This question helped the researchers to understand what account for the changes in indicators.

The data were calculated and analyzed through the SPSS programme. Factor analysis was done to determine the validation of the variables/indicators used to make the

five capitals operational in interviews. Then the mean values of the capitals for the baseline and the impact year were calculated and compared for the eight villages. Significance of differences was determined using Student's Paired-Samples T-test.

Comparative study between villages in Kaizuo and Malu townshop

To assess the effects of the GAAS team led CBNRM action research on local institutional development for natural resource management, it is necessary to understand how forest, grassland and water systems were used and managed in the CBNRM involved villages and non-CBNRM involved villages. For this purpose, another comparative study was designed and carried out in July of 2006 in 10 natural villages of Malu township and 8 natural villages of Kaizuo township (the same villages where the five livelihood-related capitals were investigated) to see differences in the institutional arrangements for forest, grassland and water resources between the communities with and without CBNRM intervention.

Malu is another township of Changshun county, neighboring to Kaizuo and has similar social, culture and economic conditions. The 10 villages were randomly selected. The information was gathered mainly from group discussions and key informant interviews. Before the field visit, general information about the villages was gathered from the township government, including ethnic composition, population, location, land areas and irrigation systems. The guiding questions for the study are listed in Box 4.1.

Ecological survey

At the beginning of the CBNRM project in 1995, the GAAS team invited a group of researchers from the Guizhou Botanical Garden to conduct a general survey on vegetation in Dabuynag and Xiaozhai. The survey covered plant species, dominant plants, abundance, density and coverage of plant communities. In order to assess whether the CBNRM action research has an effect on vegetation over 11 years from 1995 to 2006, another survey on vegetation status was conducted in July 2006. For comparative reasons, the GAAS team invited the same group of researchers to conduct the survey, and the researchers used the same investigation methods in the same two villages.

I used the data generated from these two ecological surveys as an independent data source to verify the findings of my research about the impacts of the CBNRM project on natural resource management in the project site.

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(1) Where do you graze animals? How large is the gazing area of your village?
(2) Are there rules regarding grazing animals on grassland? What are they? Who made them and how?
(3) Do you think the grassland have enough grass for animals? If not, what do you do?

(4) Are there disagreements or conflicts on grassland use between villagers or between your village and other villages? What are they? How are they addressed?
(5) How large is forest area of your village?
(6) What products do you harvest from forests (both timber and non-timber products)?
(7) How are the forests managed in your village? Why? Who decided?
(8) Are there disagreements or conflicts on forest management between villagers or between your village and other villages? What are they? How are they addressed?
(9) Where do you get drinking water and irrigation water?
(10) Who built the water facilities? When?
(11) How is the water distributed? How are the facilities maintained and managed? why? Who decided?
(12) Are there disagreements or conflicts on water management between villagers or between your village and other villages? What are they? How are they addressed?

BOX 4.1 Guiding questions for group discussion (Source: This thesis).

Field notes

As an action researcher based in the field for years, I have been involved in most of the activities of the CBNRM research project. I observed and documented the processes and actions of the events in which I was directly involved, and reflected on the outcomes with my fellow researchers. Having been working in the field for years, I had opportunities to be closely in contact with the farmers and local government officials, observing their daily lives, resource management practices, their relations related to natural resources and to each other as the CBNRM project evolved. I also had many chances to observe or even participate in the local cultural events (ritual ceremonies, sport days, singing and dance competitions) and political activities (such as village leader election). I took notes to record what I had seen, what I had heard, and what I had been told. All these filed notes later became important information sources for my PhD research.

To validate the research findings, data triangulation is required. To assess how the CBNRM worked in rural Guizhou, I used different sources of information to verify my findings, including interviews, surveys, and second hand materials (books, articles, government reports, project documents, meeting minutes, etc.). In order to avoid and limit my personal biases in the research, where appropriate, other (non-project) researchers were invited to join in the data collection and analysis.

4.3 Negotiating my role as project team leader and as a PhD researcher

I have been involved in the CBNRM research since 1995 and became the project team leader in 2001. For me, the 11-year journey of CBNRM has been an exciting learning experience: beginning with understanding the meaning of CBNRM, testing key elements/principles of CBNRM within the local context, expanding impacts of CBNRM in Guizhou province and beyond. The journey was filled with exciting experiences and also painful lessons. When woman farmers were organized to take care of their grassland and save labour by collective grazing (details see Chapter 6), we saw the value of CBNRM. But when Xiaozhai village was destroyed because of our mistake (details see Chapter 5), we realized the ethical position of a researcher in CBNRM. We must take our role and responsibility seriously!

As part of the capacity-building component of the project, IDRC provided two PhD scholarships to the GAAS research team. I was lucky to receive one. In 2003, I started my PhD study in Wageningen University in the Netherlands. I had a strong desire to write about our CBNRM research experiences for my PhD dissertation. Dr. Ronnie Vernooy, the senior program officer of IDRC responsible for the GAAS CBNRM project, encouraged my choice, which gave me confidence. However, when I developed my PhD research proposal, I had difficulty to pull myself apart from the project. I was confused, and sometimes mixed my roles as a PhD researcher and as project implementer. My promoter, Professor Niels Röling, often reminded me that I should stand back from the project. I tried hard and started to recognize some tensions between my two roles. On the one hand, I am a project implementer, someone taking actions; but on the other hand, I am a PhD researcher, someone observing the actions. For me, it was not easy to always have the awareness of these two different but interrelated roles.

During my first period of study in Wageningen, during 2003-2004, I struggled to define my research problem. My promoter always warned me: "Your research problem is not the project problem!" During that period, my problem was to find/look for a research problem appropriate for a PhD in Wageningen; I dedicated many hours of reflection to this task (see Box 4.1). I challenged myself day after day to clear my mind (and heart), because I have always had the confidence that no outsider can write about our experience better than I do. In the middle of this process, I realized that the most important thing is to be honest and to be open to our mistakes.

In June 2004 I returned to China for fieldwork. At that time the Phase III of the CBNRM research was ongoing, in its third year. Thus, while I did my fieldwork for my PhD research, I also implemented the CBNRM project with my fellow colleagues. My co-responsibilities for the project and my PhD research showed both advantages and disadvantages. Among the advantages, the project reports, meeting minutes and documentation of events provided me lots of data and insights. So I should say that the material of this thesis was generated through the project, with farmers and other members of the research team. This is thus in many ways the result of a

shared enterprise. Moreover, having been working there for years, I was familiar with the situations and sometimes felt I was part of the stories I was recording and analyzing. My close relationship with the farmers and the local government officials also was a great convenience. However, as team leader and also as a PhD researcher I had a special responsibility for the design and quality of the research, and the data analysis. I shifted between different roles and took different responsibilities in the processes of PhD fieldwork and project implementation. When I interviewed farmers, I had to explain to them my purposes, which made them confused sometimes. For them, I was someone who facilitated their collective management of forest, grassland and water systems; someone who mediated disputes between different groups of farmers and between farmers and outsiders; and someone who negotiated their needs and demands with local government. In fact, they thought I was someone who worked with them. Every time I went to the villages, I had something to do with them. That is the nature of action research! But my PhD research itself did not have much to do with them in this regard.

Hello Sun Qiu,

I thought I would say a few more things about your 'problem'. First, it is a given that PhD writing (including the proposal) is a lot about finding the right words. However, it is also important to stand back a bit, and not become too entangled in words and the play with words. That is why it is important to do other things while in Wageningen, not just read and study, and write. Go out, visit some places in Holland now that you have a chance.

Now turning to defining the thesis topic (let's call it topic instead of problem). Here are some keys for you to open the door.....

At the abstract level, one could say that you are interested in State-(Rural) Society relationships and dynamics (the political side of this we could call 'democratization' perhaps or maybe more neutral 'good governance'). The 'area' of interest is natural resource management, or the sustainable use of natural resources, as a means to provide a decent life to farmers, maintain a healthy eco-system, and also produce food and other services for the wider society. At the concrete level, you are interested in supporting farmers in a number of villages in Kaizuo township to have a stronger voice in, decision-making power about and practical management of their natural resource base (water, land, trees, roads...) and to get the Chinese government (the line agencies present in the county) to operate in such a way so as to be (more) responsive and (more) supportive of this. I guess, what this is all about, is 'MAKING CBNRM WORK in Guizhou province'.

Now, in addition, and given that you think RESEARCHERS have something to contribute to this, the State-(Rural) Society dynamics are not just about government agencies and staff on the one hand, and farmers on the other, but also about researchers - and this is where (participatory action research)

methodology comes into play.
There are various theories to look at the topic outlined above, and it is of interest to review some of these to see if they have anything to contribute conceptually and in terms of the kind of research you want to do: description/ explanation/ exploration. As examples, there is political economy and political ecology thinkers (Scott and others), there are the new institutionalists such as Putnam, Ostrom, and others, there is the social actor school of Long and others, and there is Niels and 'the social learning' concept... Methodologically, there are the PAR thinkers and do-ers (Chambers and others). What have they to say about tackling your topic (i.e., State-Rural Society dynamics or 'MAKING CBNRM WORK in Guizhou province')?

I hope this helps (as you note, I did not use the word 'scaling up' once!)

Ronnie

BOX 4.2 Dr. Ronnie Vernooy's e-mail response to my search for the right research problem (what he called the 'problem of the problem')

Of course, I also shared my PhD research with my colleagues and explained my thoughts to them, because I did not want to make them think that because I was boss, so they must help me in data collection. I was lucky that my colleagues were very supportive. We together designed and tested the questionnaires, interviewed farmers and analyzed data. In this regard, I would like to consider my PhD research was also a joint learning process. However, using theoretical frameworks to analyze our work has been always the weakness of the team, which makes the team more like CBNRM practitioners, rather than researchers! Nevertheless, most of our reports and articles stayed at the level of describing 'what happened'. There was little about 'how and why something happened'. Without theoretical argument, the value of our work was discounted in both an academic sense and as policy advocacy. Therefore, I have determined to take the opportunity of doing a PhD to provide theoretical strength to the analysis of our years' experiences.
As the process went on, I also came to realize that the interplay of my roles and responsibilities sometimes gave rise to ethical dilemmas - things I would have to do as a researcher could not be pursued in the context of the project. In order to understand the impact of the project on farmers' livelihood change, 25 households were randomly selected from each village of total eight villages, so in total 200 households. We spent 2 to 3 days for each village interviewing them household by household. The interviewing was time consuming and needed patience from both interviewer and interviewee. Sometimes more than two family members were involved in the interview. Even though they were cooperative, I still felt my research bothered them. We had already bothered them so much for our purpose of 'scaling-up'! We

often invited mass media and different levels of government officials to their villages, and asked them to share their experience, in order for the outsiders to understand the value of CBNRM. Now I came to visit them again, asking more questions. I had developed strong personal feelings toward the CBNRM research, which I had been deeply involved in for years. I realized that these feelings definitely would influence my analysis. My experiences of negotiating between local communities and other stakeholders made me emotionally sympathetic to farmers. However, I never felt that my personal thoughts would be a problem for the quality of my research, because honestly sharing my personal experience in every day struggles should be part of the research, which hopefully would give some insights also to the other researchers and practitioners.

Of course, it was also important that I kept it in mind that my PhD research was part of the project, and as such, would make a contribution to the work, but that it would never replace the project! Therefore, in parallel to my PhD research, I continued to commit myself to project implementation efforts. This explains why my PhD fieldwork took much longer than normal full time PhD studies.

5 The stakeholders and their stake holding

This chapter presents the main stakeholder categories, their interests, and their stakes in natural resource management. Its main purpose is to analyse how these change over time; and to show how the GAAS team tried to facilitate stakeholder interactions. The analysis yields by means of 'mini-cases' deeper insight into what is at stake and how the various actors exercise their stake-holding. Stake-holding processes give rise to the identification of new stakeholders and new relationships to what is at stake.
In this chapter, I am inspired by Foucault (discussed in Klouda, 2004), who asks what happens when an intervention, like the GAAS research project or government programs, changes people's relationships to 'things' (in this case, natural resources), their relationships to and with others, and their relationship with themselves - i.e., how they perceive their own ideas changing in this dynamic. I will continue to explore these questions in this chapter.

5.1 The concept of stakeholder and stake-holding

Many natural resource management situations are characterized by a complex web of interests between interacting sets of different stakeholders (Grimble & Wellard, 1997). A stakeholder is any individual or group (organized or unorganized) who has an interest in a particular issue or system. This includes people who can affect (determine) decisions or actions and some who are affected by decisions or actions positively or negatively (Grimble & Chan, 1995; Grimble & Wellard, 1997; Hemmati, 2002). Jiggins and Collins (2004) define stakeholders as "those who have a 'stake', a real material interest, from their perspective, in the situation of resource under consideration." According to them, the stake one person holds, for instance in a catchment, could be to be "a resident in that area, a domestic water user, a farmer using groundwater for irrigation, a professional water manager or a government official placed at one or other administrative or elective level. An individual, or group of individuals, may hold a number of overlapping or separate stakes in a resource" (Jiggins & Collins, 2004: 5). In natural resource management scenarios, Röling and Wagemakers (1998) consider that stakeholders are basically resource users and/or resource managers. It is important to identify stakeholders and understand their interests, and to be aware of potential conflicts among the stakeholders (Röling & Wagemakers, 1998).
Stakeholders are constructed by the 'stakes' they hold for their certain interests (Jiggins & Collins, 2004). Jiggins and Collins (2004) use the concept of 'stake-holding' to expresses the idea that stakeholders actively construct, promote and defend their stake. In other words, stake-holding is a dynamic process of stakeholders pursuing their interests. In collective actions, "stake-holding implies a shared interest

among group members, although individual members might still perceive their own stakes in different ways" (ibid: 6). Therefore, to achieve a common goal of sustainable use of natural resources in situations characterised by multiple stake-holding processes, negotiation, dialogue and joint learning are the key elements necessary to bring stakeholders together in an organized way. Then, "the process of discussing, questioning and acting around a material object helps to define the stakes and stakeholders. As these identities emerge they may come to be shared by wider communities and networks of stakeholders." (Jiggins & Collins, 2004) This ongoing process of defining positions requires avoiding too rigid forms of analysis.

5.2 The main stakeholder categories in the Guizhou CBNRM action research

The GAAS team defined stakeholders as those who have direct interests and stakes in natural resource use and management; they could be individual people, groups or organizations. By this definition, there are a range of stakeholders involved in natural resource use in Kaizuo, i.e., there are different groups of farmers, the township government, line ministries, the county township, private businessmen, the GAAS team, and international donors (IDRC and Ford Foundation). These stakeholders have different interests in natural resources and therefore, the roles they play in resource use and management vary. According to their roles or functions, these stakeholders can be categorized as primary stakeholder, intermediate stakeholder, and owners or key stakeholder (Jiggins & Collins, 2004). By these definitions (see Table 5.1), a primary stakeholder is one who takes actions in CBNRM research and who is directly affected by those actions; an intermediate stakeholder is someone who facilitates or provides resources for CBNRM action research; and a key stakeholder is one who can stop the CBNRM actions. Over time, actors can assume different stakeholder roles. In this sense, the categorization presented in Table 5.1 can best be seen as a first-cut analysis.

Indeed, as the GAAS team's work proceeded, we came to understand these categories somewhat differently. For instance, the role of intermediate stakeholders identifies them in some sense also as key stakeholders -their power to give services or 'kill' activities was revealed as the CBNRM research proceeded. Also, the uncertainty experienced by the key stakeholders about their own powers and roles in a period of transition, became much clearer. I will return to these points later in the chapter. First, however, I want to present more information on the stakeholders' interests and what was at stake.

5.3 Stakeholder interests and what is at stake

By 'stakeholder interests' I mean the formal or occupational, or sometimes also

Category	*Definition*	*Who*
Primary stakeholders	Those who are directly affected, either positively or negatively	• Village members (both men and women) • Various groups of resource users • Elected resource managers • Village leaders
Intermediate stakeholders	The intermediaries in the delivery or execution of research resource flows and activities	• Township government • County line ministries • The GAAS team • IDRC, Ford Foundation
Key stakeholders	Those with the power to influence or 'kill' activity	• Township government • County line ministries • The GAAS team • IDRC, Ford Foundation

TABLE 5.1 Stakeholders in the GAAS-CBNRM action research. (Source: Adapted from Jiggins and Collins, 2004)

informal or personal interests a stakeholder might have in a natural resource. Different stakeholders have varied interests and perspectives in natural resource management, and they may change over time. For sustainable natural resource management, it is essential to bring together different stakeholders, to create consensus between them on how resources should be managed and to commit them to the results of the consensus reached. To do so, we first need to understand their interests and related points of view in the resource in question.

For purposes of illustration, I first present these for selected stakeholders in each category. In Table 5.2, main interests are identified, which, according to my observations over time, have remained at the heart of each stakeholders' concerns.

We can see from this preliminary analysis that potential for conflict lies in the differences of 'what is at stake' for different stakeholders. For example, if a water manager does not release the flow of irrigation water fairly; those at the 'bottom end' of the system might lose their basic food for the rest of the year (see Chapter 6). Another example of conflict over resources is the competing use of grassland among fern harvesters, cattle owners and goat raisers. Matters become more complicated even than this example shows, because some fern harvesters are also cattle owners or goat raisers, and goat raisers are also cattle owners, i.e., in this case there is a potential for conflict in the relationship between people and in their relationship to the natural resource, but also, notably, among their own diverse livelihood stakes. When different line ministries come to claim grassland for fulfilling their obligations, the situation becomes even more complicated, and agitated!

Stakeholders	*Interests*	*Commentary*
Goat farmers	• Access to grassland • Access to forests • Access to water	• Goats and cattle/buffaloes can not be grazed together because cattle and buffalo will not eat grasses pastured by goats • Goats eat the roots of grass and bushes. Without control, they can cause degradation of grassland, and other animals lose weight • Goats reproduce very fast; this gives access to market income year round
Water managers	• Maintaining village water system (drinking and irrigation) • Easily collecting water fee • Controlling 'stealing' of water • Gaining respect and influence	• Difficulties in water fee collection, related to how other village management matters are conducted • Dealing with those who steal water while maintaining respect, etc. • Managing the flow of irrigation water through the system fairly (top end - bottom end conflicts)
Natural village leaders	• Getting resources from township government for both self and public, such as free fruit tree seedlings or free virus-free seed-potato, etc; a drinking water project or a village road project for their villages • Gaining reputation in their villages and being more influential	• They are elected from the farmers in villages • Managing village affairs on non-paid basis[3]. Manage village fund (incomes from renting out collective land etc.) • Are responsible for organizing farmers to discuss and make decisions about village affairs, and implementation of the decisions • Represent the village when negotiating with outsiders (government, private, and other villages) • Channel government messages to farmers and report farmers' complaints, needs to the local government • Help township government to fulfil their tasks such as tax collection, tobacco planting, family planning, etc • To be a village leader is time consuming business, and it is not easy to satisfy everybody in the village, so not everyone wants to be elected as a village leader • No woman farmer has become a village leader in Kaizuo

3 Started in 2005, the village leader gets 10 RMB payments (very small money) for each month from the township government for helping the government to fulfill their tasks. However, the payment is very small, and does not give the village leaders much economic incentive. From our observations, this payment does not cause changes in the relationships of the village leaders with the farmers and the government.

Stakeholders	*Interests*	*Commentary*
Township government officials	• Fulfilling tasks and gaining recognition • Generating revenue • Making achievements and being promoted • Leaving township and finding a position in county • Gaining reputation by doing good things (get more projects for villages)	• Township is the lowest level in government bureaucracy • Direct implementer of rural policies and programs • Provide public services for rural populations • Task pressures from 'up' and demands from 'bottom' • Large scale • Insufficient financial support and difficulties in revenue generation • Most of their families are not in the township where they work
Forestry Bureau	• Fulfilling tasks of reforestation, afforestation, logging ban enforcement for natural forests, forest fire control, forest survey etc.	• Task driven • Technology-focused and standardized approach • Penchant for large scale
The GAAS team	• Testing how CBNRM could contribute in China to sustainable natural resource management and livelihood improvement of rural people	Strategies used and actions taken: • Organizing farmers and developing local institutions for sustainable natural resource management • Promoting participation of stakeholders especially farmers • Building capacities of farmers and officials through CBNRM action research • Building platforms for communication and negotiation among stakeholders • Promoting cross-scale institutional linkage for good performance of local institutions

TABLE 5.2 nterests of selected stakeholders. (Source: Field data)

5.4 Administrative structure

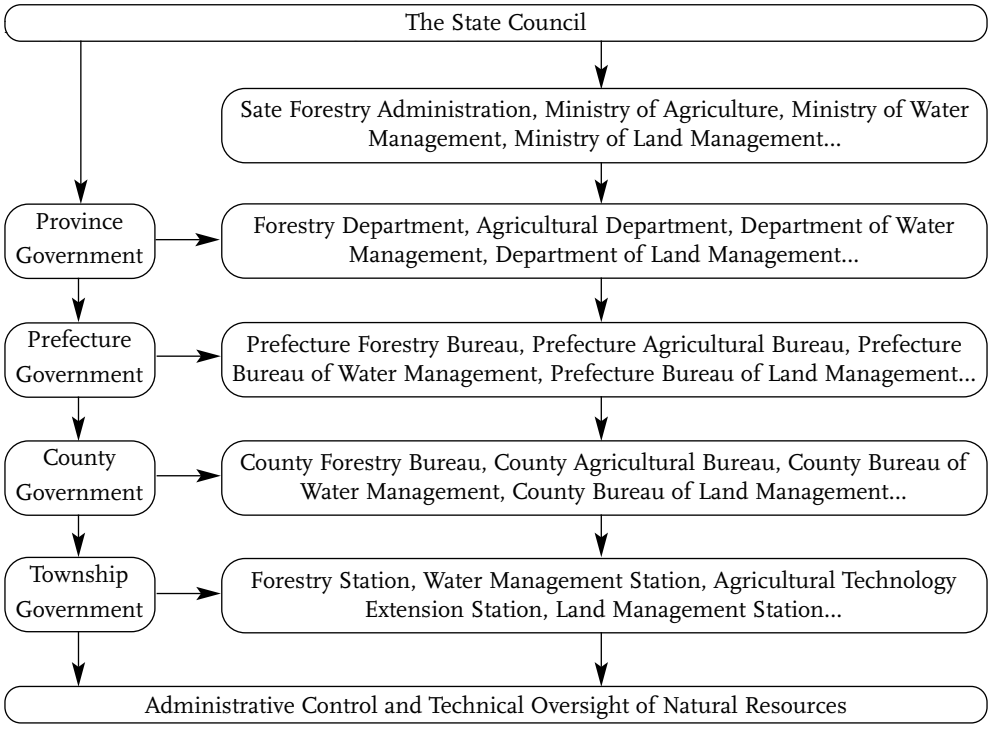
Figure 5.1 shows the relationships between various levels of the government and the line ministries, and the relationship between different line ministries. Administratively, the line ministries are under the leadership of governments at each level; technically, each line ministry receives instructions and guidance from the higher level within the ministry. Taking the county forestry bureau as an example, we see that the directors of the bureau are appointed by the county government, and the bureau also receives basic operational funds from the county government;

therefore, it can be expected that the bureau responds to the county's demands (gathering government revenue from logging, for example). At the same time, the bureau takes the responsibility to carry out the forestry law and implement programmes and projects under the technical guidance and supervision of the Prefecture Forestry Bureau, the next highest level in the forestry hierarchy.

There is no formal linkage across the different line ministries within the administrative structure. In practice also, there is no mechanism for interaction between line ministries. The overlapping of responsibility for the same natural resource causes tensions between these line ministries. For example, regarding the use of 'wasteland' in Changshun County, the Forestry Bureau wants to plant trees to fulfil its reforestation task, the Bureau of Land Management wants to terrace the 'wasteland' to accomplish its land improvement task, whereas, the Bureau of Animal Husbandry wants to use the 'wasteland' as grassland to raise animals. Not surprisingly, the GAAS team found instances where the already forested 'wasteland' was later terraced by the Bureau of Land Management. Gemma Van der Haar (2001 citied in Nuijten, 2004: 108) has conceptualised this situation as 'claims to governance'. She refers to competency claims between line ministries or levels of government as the claims to exercise competencies in the fields of administration and jurisdiction of land and other natural resources. To some extent, these claims exist in parallel fashion, but they may enter into contradiction in specific domains or at specific critical junctures. Such claims, however, always need to be problematised.

When a development initiative (for instance, The Western Region Development initiative) needs cooperation between line ministries, the government establishes a bureaucratic unit to coordinate the cooperation (in this case, the Western Region Development Offices at each level of government).

Kaizuo has four administrative villages. An administrative village is managed by a village committee and party branch committee. The village committee is the villagers' self-governance organization (Organic law on Village Committee, 1998). The law states that the committee members must be elected by the villagers who live in that administrative village. The village Assembly is the highest authority in decision making at this level. The party branch committees are elected by the party members of each administrative village although the township party committee has a strong influence on the election. On paper, the village committee and the party branch committee have different functions, but in reality their functions overlap. Normally the party secretary has more power than the administrative leader in terms of receiving more support from the township government. In many cases, the major functions of these two committees are (1) managing village affairs, e.g., organizing farmers in collective activities (village sports in Kaizuo, or participating in government programs, for example), solving disputes between farmers and between natural villages, managing the village fund, etc.; and (2) assisting the township governments to accomplish their different tasks such as tax collection, family planning, etc. This is usually their main function. The leaders of these two committees in Kaizuo receive the very small sum of 100 RMB each month from the township government in



Note: the arrows represent instruction flow

FIGURE 5.1 Administrative structure in China (Source: Adapted from Liu, 2006:90)

5.5 Stake-holding for natural resource use - at community level

CBNRM initiatives seek to promote collective action for sustainable natural resource management. In order to promote collective action it is important to understand stakeholders' needs and interests. At the early stage of the CBNRM project, the GAAS team conducted participatory rural appraisals (PRA) in targeted villages. The PRAs aimed to understand general socio-cultural and economic situation, natural resource status, and farmers' needs and interests; to identify issues related to natural resource management and constraints farmers faced in gaining their livelihoods; and to develop action plans. Though at that time the GAAS team did not know the term of stakeholder analysis, in the PRA practice we engaged with different group of farmers such as men, women, the poor, the rich, village leaders, school teachers, and farmer technicians to understand their perceptions, values and interests. Discussions were held to open up their different perceptions and concerns, and village meetings were organized to determine the next steps in creating new CBNRM arrangements. Their interest/needs and concerns (giving priority to women and the

poor) were reflected in the action plans. Even though we received a short-term PRA training, we were at that time not sensitive enough to the social aspects of natural resource management (understandable, given our natural science background (see Chapter 2). We made mistakes, but learnt valuable lessons.
In the following section, I present two cases to illustrate how different stakeholders within a community are inter-related in the exercise of their stake-holding, what conflicts emerged, and how the GAAS team facilitated collective actions to bring the different stakeholders together to solve those conflicts. The section concludes with discussion of the challenges and lessons learned. The two cases also show that good intensions will result in bad outcomes if one ignores the social aspects of the interventions induced by outsiders such as the GAAS team.

5.5.1 Competing claims over grassland - cattle owners, goat raisers and fern harvesters

To develop animal husbandry is a major strategy of Guizhou province, in order to change mono-grain agriculture and to increase farmers' income. As a consequence, a black goat-raising project has been initiated in many counties in Guizhou, and Changshun is one of the recipients. The Bureau of Animal Husbandry of Changshun County started a goat-raising project in Kaizuo in 2005. Seed-goats were given to farmers as a subsidy provided by the project. The lessons from previous experience (Box 5.1) suggested to the GAAS team that the project would give rise to conflicts between cattle or buffalo owners and goat raisers unless there was an agreed solution to the potential conflicts

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In 1996, the GAAS team introduced black goats to two villages, Xiaozhai and Dabuyang (also see Chapter 6). Conflicts between cattle/buffalo owners and goat raisers arose, because goats threatened the nutrition of cattle/buffaloes and also the sustainability of the grassland. According to the farmers themselves, goats are a grassland-damaging animal, eating not only grass but also grass roots and shrub leaves, thereby seriously degrading the productivity and sustainability of the grassland. Moreover, they said, goat populations grow very fast; a mother goat can give birth to 4-7 baby goats a year. Farmers also reported that cattle and buffaloes did not eat the grass touched by goats. They complained that their cattle and buffaloes lost weight and that the crops were eaten by the goats. For farmers, cattle and buffaloes are the more important animals, providing animal traction and manure, and they have become an important income source in recent years. Almost every household in Kaizuo has at least one cattle or buffalo, and now many households have three or more cattle or buffaloes. Farmers graze their cattle and buffaloes on grassland all year round, feeding them maize only during the ploughing seasons and rice straw in winter as supplementary feed. The formally 'huge' grasslands have become crowded because of the increase in animal numbers. In the final

GAAS evaluation of Phase I and II of the CBNRM project, farmers listed goat raising as one of the most unsuccessful activities (Vernooy, et al., 2003). With the GAAS team's help, the goats introduced to Dabuyang and Xiaozhai were sold out.

BOX 5.1 Black goat raise project. (Source: The GAAS team, 2000)

Now, goat raising has become the provincial government's strategy to increase farmers' income! The solution to the conflicts cannot be simply to sell out all the goats introduced to Kaizuo, as the GAAS team did years ago in Dabuyang and Xiaozhou. On the one hand, the GAAS team could and did advocate to the county government that the goat raising project should be halted and that more suitable projects, such as cattle raising, should be introduced instead. But things are not as simple as this. For local governments, fast economic development is their priority, and goat raising can increase farmers' income quickly. Therefore, the local governments are not concerned with the matter of the project itself, but with the matter of short-term economic gain. The GAAS team's advocacy was really a very weak shout in confrontation with the government's desire for economic development (also see Chapter 6).

On the other hand, the GAAS team worked with the Kaizuo township government to facilitate the goat raisers and cattle/buffalo owners to reach an agreement and make rules. The agreement that was reached is to separate the grazing goats and cattle/buffaloes. The rules clarify which areas of the grasslands are only for goats or cattle and buffaloes, and make clear what the punishments would be if goats run into the areas set aside only for cattle and buffaloes. By this means, the conflicts between goat raisers and cattle/buffalo owners have decreased (also see Chapter 6). But the issue of controlling the overall goat population so as not to destroy the grasslands has not yet been addressed. This needs the involvement of the Animal Husbandry Bureau or even the county government. What this case illustrates, is that stakes are created through interventions and in subsequent interactions, they are being negotiated and renegotiated over time as point of view and interests change. I will return to this issue in the following sections of this chapter.

In recent years, fern sprouts have become a popular wild vegetable and have a high market demand. In the spring season, farmers, especially women, children and the old, collect fern sprouts from the grasslands and sell them to middle-men. If the fern sprouts are just collected there is no harm to the health of the grasslands. But the problem is farmers have begun to burn the grassland in winter in order to have more and better fern sprouts in spring. Most of grasslands in Guizhou are on hills and mountains; burning grasslands easily causes serious soil erosion and grassland degradation. The illegal burning of the grasslands comes about as (some) farmers pursue the short-term income earning opportunity offered by the fern sprouts. Matters become more complicated even than this analysis shows, because the fern harvesters are also cattle/buffalo owners and probably also goat owners. Their diffe-

rent interests conflict with each other, i.e., there is in this case a potential for conflict in the relationship between people, in their relationship to the natural resources, and - often for the same individual - in the differing interests of their diverse livelihood stakes. This challenges community-based grassland management. Though rules have been made to control the burning of the grasslands, rule enforcement is still difficult because the people who set the fires are not easily caught in mountainous areas (Field notes, December 21, 2005).

5.5.2 A mill house damaged collective action of Xiaozhai village

Xiaozhai village became involved in the CBNRM project in 1995. Xiaozhai is a small natural village with only 30 households (122 people in 2006). It belongs to Dongkou administrative village of Kaizuo township. The interventions included construction of a tap drinking water facility, village road, and water pond, fruit tree planting, installation of television signal receiver, building a mill, reforestation, etc. The purpose of the interventions was to mobilize the farmers to take collective action for livelihood improvement and sustainable natural resource management (The GAAS team, 1998; Chen, 2000). In the first few years, the farmers were organized and the management institutions were established for construction and management of the drinking water system, orchards, village road, and forest. At the end of 1998, the GAAS team proposed to build a mill house in Xiaozhai. There was no mill house in the whole Dongkou administrative village. The farmers transported their grains on wheelbarrow to Kaizuochang village, which is several kilometres away from Dongkou administrative village. And the road condition was not good. Xiaozhai is located at the centre of the administrative village so it seemed the 'logical' place to situate the mill.

The idea to build a mill house was first floated to farmers who agreed with the proposal. A central site was indicated for its construction; Xiaozhai would serve farmers from Xiaozhai and the nearby villages. Farmers were excited and happy that their problem of tracking long distances in search of a mill was soon to end, but then a number of issues arose and posed a big challenge. The main issues were: who was to run the mill; who would foot the initial investment in terms of purchasing the machine; and how the village would meet the cost of the payment of the licences for the high voltage power lines required. The costs were estimated to amount to 4000 RBM; GAAS was not willing to shoulder the whole bill. To find a solution to this problem GAAS organized a meeting with all the villagers, and after a long debate it was agreed between the parties that the GAAS project would purchase the machine, which would then be the property of the whole village (Field notes, December 2000). It was further agreed that a volunteer within the village who could afford to raise the required money to pay for the licence would be allowed to lease the processing machine from the village. Despite the fact that the mill was a potential source of revenue to whoever opted to run it, the amount of money needed for the licence was prohibitive to the poor villagers.

The one villager who showed his interest when this issue was discussed in village

meetings to decide who would run the mill house, was the party secretary of Dongkou administrative village at that time. He offered to lease the mill house from the village (at 1000 RBM per year) and apply for the power line and pay for the licences in his own name. He and his family were influential and powerful in the village. He has three brothers in Xiaozhai village, and one of them was Xiaozhai village leader. The party secretary got the mill house, and his son took on the daily operation of the mill. One year later when it was time for him to pay the lease fee to the village for the mill house, the party secretary refused to do so saying he could not make money from the mill business.

According to the villagers, his son was not honest and often stole some of the farmers' grains. Farmers also complained that the processing quality was not good and the boy's attitude was not nice. So villagers still preferred to transport their grains to the mill houses far from their villages. Later the GAAS team heard (Field notes, December 2000) that another important reason that villagers were not willing to process their grains in that mill house was because the villagers did not like the party secretary and his brothers. Villagers thought they were a big family in the village, so their behaviours were arrogant. More accusations were levelled against him and his brother: he was said to be selfish, and his brother, the Xiaozhai village leader, was said to misuse his power in the administrative village, and abused the village fund generated from contracting village land to mining interests. All these accusations led to villagers' 'silent' action of boycotting the mill house and thus creating losses to the man who ran it.

The GAAS team and township government tried to intervene as the situation got out of hand; some villagers also had decided not to pay the water fees, citing the example of the party secretary who had declined to pay the mill house annual fees. One of the water managers also took advantage of the situation to run away with the water fees that had been collected. The deteriorating situation created a worsening condition of the common resources as no one accepted responsibility for them any more. The drinking water system was damaged, the village road was not maintained, the television receiver was broken, and the village fund was abused. The GAAS team was surprised at the turn of events; at the first meeting the villagers had attended to decide who was to run the mill, no one spoke against the party secretary. It found the accusations and turn of events hard to believe and understand. The GAAS team and township government thought the best approach was to change the party secretary, through elections, and provide training on village leadership, and these 'remedial actions' were taken. Yet there is still little evidence of improvement in the situation.

It also turned out that one of the GAAS team members had been compromised in the process by the party secretary, through partaking in good meals and using his influence in favour of the party secretary getting the right to run the mill. These were difficult lessons to learn. The GAAS intervention had turned the village members against each other and the outcome was not as envisaged. With hindsight, the GAAS team realised they had missed carrying out a proper analysis of the social

aspects of the object (the mill house), and people's collective and individual stakes in such a facility. Thus the villagers' trust was destroyed as a result of a simple intervention and it will take a long time to rebuild the community's trust given such a history.

5.5.3 Lessons learned about stake-holding

The above two cases led us to re-analyze our understanding of stake-holding. We began to see the power of 'objects' - such as goats and a mill house- to change social relationships. We began to see them not just as 'technologies'. We came to understand that technology development is not a pure mechanical process, but that it comes with unintended and unforeseen consequences that are beyond the immediate control of anyone in particular. We also realized that history counts, as people draw on previous experiences with interventions and interactions with others. These lessons meant for us that we should pay more attention to how to facilitate the relationship between resources and people, and the relationship between different groups of people. At this point, however we realized another dimension of stake-holding. We began to appreciate that what was of interest to us was how individual and group exercise their stake-holding. We also came to realize the possible risks upfront from our interventions if the social aspects of 'technologies' are not carefully analysed. We realised how important it is to understand how interventions such as a new farming technology or a new variety might affect relationships between natural resource and people and also the relationship among different groups of people, to analyze who would probably gain or lose from the new intervention. This kind of social analysis can help action researchers to understand the social nature of natural resource management and to avoid potential conflicts over natural resource use (Vernooy & Fajber, 2006).

These cases made us realize that we must play our roles seriously, over a long period of time, and despite set-backs. CBNRM action research is not a matter of playing with people! Mistakes and set-backs can possibly bring losses to local communities and farmers, and could also harm the reputation and perceived good-will of researchers.

5.6 Stake-holding involving deeper complexity - at a higher level

As the CBNRM action research evolved, more stakeholders became involved in it. And in recent years, some new stakeholders like fish farmers, and an iron factory, have come to Kaizuo. In addition, more government programs have been implemented in Kaizuo. From the perspective of the local government administration, the new comers and the county line ministries have become the important stakeholders in natural resource use and management. Here I present two cases to illustrate what their interests are, how they practise their stake-holding, what new relationships have developed, and how the GAAS team sought to facilitate collective actions to

bring the different stakeholders together to manage these relationships. The section concludes with an analysis of the challenges and lessons learnt.

5.6.1 Competing claim over grassland - among farmers, township government, line ministries, and private people

I begin again with the management of grasslands but this time, I also take up the perspectives of newcomers, township government, and line ministries. Before the early 1990s, the grasslands in rural Guizhou were little used, except by the farmers who grazed their cattle and buffaloes; the animal numbers were quite low. Grasslands were not considered by the local government or line ministries as a valuable natural resource; therefore, they were called 'wastelands' in Guizhou. Even though property rights related to the grasslands are titled to the natural villages, in fact, grasslands were considered and managed as open access resources by virtue of their 'uselessness'. However, in recent years, grasslands have become a resource that many individuals and institutions claim for use, including the goat project members and the fern harvesters, as the following three cases indicate. One could say that they are becoming very useful now!

Claiming clay soils

Years ago, people found valuable clay soils used to make porcelain in some areas of the Kaizuo grasslands. The township government, the leaders of administrative villages and of natural villages are keen to contract these areas of the grasslands to private people to dig the clay soil, so that they can share the contract fee. The three parties have to negotiate with each other as to how they will share the fees generated from the contracts given out. In the process of negotiating for the amount and division of the contract, fee disputes and conflicts often arise. These conflicts often are driven by known and hidden vested interests; the awarding of contracts becomes critical as members of the teams try to favour their friends, relatives and whoever is offering some 'kickbacks' in the form of gifts and/or money. In the case of contractors who are relatives of the officials and village leaders, it is expected that once they get these contracts, they will honour an obligation in the future to return the favour. This may be in the form of helping out in case of a need or trouble (social capital) as well as by means of more direct favours. Some form of compromise between village leaders and government officials has to be arrived at, but each party knows that whoever leaves the negotiation with his friend getting the award becomes influential in the township. Hence a lot of lobbying takes place prior to such meetings.

Another important issue that leads to conflict, concerns how the official contract fee is actually put to use in the village where the grasslands have been contracted out. Villagers are always up in arms with their leaders due to lack of transparency in the way the leaders handle the fees. The villagers want the money to be used transparently and for the common good of the village; they therefore use their voting power to remove leaders from office who hide or cheat over these transacti-

ons, but they continue to be disappointed. Once new village heads come into office, they in turn continue with similar behaviour. In Kaizuochang village in Kaizuo, villagers have elected new village leaders several times since one area of their grassland was contracted out in 2005, but according to the villagers this has produced little change (Field notes, July 2006). Villagers can hardly trust village leaders nor trust each other. One villager said they had a 'trust crises in their village now because of such contractual arrangements with interests outside the community (Field notes, July 2006). The tradition of mutual-help is very weak nowadays in Kaizuochang. The villagers do not help each other to build houses like before; rather they pay private construction teams to build their houses.

Afforestation programme

The County Forestry Bureau sets annual tasks for afforestation or reforestation. The number of trees planted in the county territory is a performance indicator for both the bureau and the county government. The Forestry Bureau distributes the tree-planting task to the Forestry Stations based in each township, according to the area of 'wasteland' of each township. The 'wastelands' are normally the places where the farmers graze their animals even though they are planted with trees. Although the Forestry Station does not allow farmers to graze animals where trees have been planted, farmers still continue grazing their animals there. This is one of the main reasons why the survival rate of the 'bureau's trees' is very low in many places in Guizhou. Of course, conflicts between foresters and farmers over the 'wasteland' do easily happen in a situation like this.

Land improvement programme

A farming land improvement programme was initiated in China in 2004. County Land Management Bureaus are responsible for programme implementation. In the mountainous areas like Guizhou Province, the main activity of the farming land improvement programme is to terrace the hillside lands, and thus convert 'wastelands' to arable lands. The extent of farming lands 'improved' by terracing is a performance indicator for both the County Land Management Bureaus and county government. The County Land Management Bureaus distribute the task to Township Land Management Stations. Kaizuo township has been covered by the programme since early 2006; since then about 100 hectare 'wastelands' have been terraced.

Driven by the task pressure, local officials give little consideration to the question of where farmers can graze their animals when the grasslands are afforested, terraced, or contracted for clay digging. Farmers of one village in Kaizuo in response blocked the terracing tractor hired by the Township Land Management Stations, not allowing them to terrace their 'wasteland'. And it is also not unusual to see the Land Management Stations terracing the lands that have been reforested by the Forestry Stations, or farmers grazing the goats given by the Bureau of Animal Husbandry on the newly reforested or terraced lands, or the Forestry Stations con-

verting the already improved (terraced) wastelands to forestlands again. The competing claims over grasslands by multiple stakeholders show the complexity of common-pool resource management. These stakeholders are interdependent, the relationships among stakeholders are complicated, and the outcomes of their stake-holding are uncertain regarding natural resource management. This requires therefore a continuous assessment of local power dynamics in terms of who participates and who not, who gains and who not, and how the outcomes of these struggles affect broader livelihood strategies of farmers as well as the strategies and careers of government staff.

5.6.2 Competing claims over water - farmers, township government, fish farm and iron factory

The Kaizuo township government has a challenge to raise revenue to meet its obligations; its resources are limited. The total area of high value crops that generate revenue through value added tax, such as tobacco, is small. The absence of significant high revenue generating enterprises makes it worse for the township administration. This has resulted in financial constraints, and the major priority for the government is to put in place strategies to use all available natural resources at its disposal to generate the much needed revenue. The strategies put in place include: encouraging farmers to plant tobacco, contracting water reservoirs to fish farmers, contracting grassland to clay diggers, and attracting factories by offering good conditions (for example, placing high-voltage electricity). As the township government sought to meet its revenue generating goals, it did not realise that a bigger problem would arise; namely the competing claims on resource use by the multiple users. A case to elaborate this is explained below, the case of Huanjiazhai water reservoir, whereby different stakeholders fight for water to meet their various needs (i.e., domestic, farming, industries). The case elaborates a web of conflicts in terms of contesting claims to water resource usage (Field notes, April 2005 and June 2006). Huanjiazhai water reservoir and its connecting canal is the largest irrigation system in Kaizuo. It was built during the commune period in the early 1970s. The irrigation system covers about 200 hectares of paddy fields across 10 villages (Kaizuo township, 2005). The system has been managed by Kaizuo township government since the break down of the commune. The township government, with its limited resources, is not able to maintain the irrigation system, which has resulted in serious water losses through leakages. This affects the users of the scheme. Sometimes the water floods farms and some farmers do not get any water at all. The fact that the government still demands water taxes from farmers yet cannot do the maintenance is another source of conflict. Yet another conflict arises between farmers at the head of the reservoir and those at the end, who feel that some are getting the water, and hence benefiting from the scheme, while others are getting a raw deal -despite paying the water tax, they never get any water.

When the township government contracted the reservoir to fish farmers in 1998, the situation became even more serious. In the rainy season, the fish farmers disch-

arge water from the reservoir, because they want to keep the water at a certain level in order to ensure that the fish do not move out of the reservoir with the flood waters; conversely, in the dry season they do not want to release water for irrigation, in order to maintain the levels required for raising the fish. This results in many conflicts with irrigation farmers.

Yet other interests are at stake. The reservoir is a source of drinking water for three villages located close to the reservoir. This drinking water system also services the township. Since the government leased out the reservoir to fish farmers the water has been polluted. Two of the villages have stopped using the tap water from this source, and they now get their water for both drinking and irrigation from wells. This has increased the demand for household labour and labour to work their farms as more time is spent in fetching water from the wells. One of the villages that shares its reticulation system with the township has continued to use the water, with unfortunate health consequences. In one incident, during a wedding ceremony about 20 people fell ill as a result of drinking the polluted water.

The tap water system has finally collapsed and the villagers are not happy with the township government. The lack of concern for a fair and safe use of water and the poor maintenance of the system has greatly inconvenienced the farmers, who now spend less time on their farms in their search for clean and potable drinking water, and who face lower yields and profits. Further, new comers have entered the scene, bringing additional demands on the water supply. In 2004, an iron factory was attracted to Kaizuo by the township government. One of the villages, Kaizuochang, leased out land to the iron processing factory. This factory needed large quantities of water for cooling; hence it dug a deep well to abstract groundwater. The groundwater system is connected to the water pond of Guntang and spring well of Dabuyang. According to farmers, because of the huge quantity of water now abstracted by the iron factory, the Guntang water pond has gradually dried out and water level of the Dabuyang spring well in 2006 reached the lowest in the village's recorded history (also see Chapter 6).

The complex web of interests operating at supra-village levels, principally those of the local government, line ministries, and business hierarchy, and the divergent perspectives these bring on what is at stake in natural resource management, have been shown in the above cases. The claiming of stakes is an ongoing process. As resources are becoming scarcer and hence more valued, economic considerations are becoming more important. The trends of individualization and polarization seem evident. I now turn to consideration of how the administrative structure mediates and interacts with these interests.

5.7 Discussion and conclusions

5.7.1 Web of conflicts over natural resource governance, management and use

The cases presented in this chapter show the web of conflicts that enmeshes stake-

holders in overlapping responsibilities, the dispersion of control over what are essentially the same biophysical resources, and the competing claims that stakeholders assert with respect to those resources. I have shown that the stakeholders who need to be considered in any analysis include a range of individuals and organizations, each asserting a particular interest. The public authorities, rather than asserting a general public interest, are caught in the web as they pursue their own interests. Let me take here grassland once more as the example. I have shown that the stakeholders in the grasslands include a range of farmers with different interests (cattle/buffalo owners, goat raisers, and fern sprout harvesters); confusingly, individual farmers may combine more than one livelihood interest in their stakes. The way in which they exercise their stake-holding depends in part on which livelihood interest is paramount at any one time, increasing the difficulties of reaching collective organisation and purpose in CBNRM. Moreover, the grassland stakeholders also include business people (clay soil businessmen and fern sprout middlemen) who exploit resources in the grassland communities but who typically do not reside in or come from the grassland communities; the township government, and a range of the line ministries (the Forestry Bureau, the Bureau of Land Management, and the Bureau of Animal Husbandry), each of which guards a different set of interests and which exercises its stake-holding in terms of its own technical and operational interests. The resulting situation may be characterized as one of competing claims, complexity of relationships, and uncertainty of outcomes.

In order to develop a clearer analytic picture of the different kinds of conflict arising between stakeholders in this situation, I now use the framework developed by Grimble and Wellard (1997:180) to categorize the conflicts described in earlier sections of this chapter. Grimble and Wellard propose a four-cell matrix defined by scale (micro-macro) and orientation (whether conflicts are oriented across scale boundaries or remain within scale boundaries).

Intra micro-micro conflicts

- Breaking of rules and regulations made by villagers, such as protection agreements for grasslands, forest (not to set fire to the forest, for instance) or misappropriation of funds, etc.
- Disputes over the unfair distribution of work and profits (for example, irrigation water distribution)
- Competing use of natural resources among different groups of farmers (cattle/buffalo raisers, goat raisers and fern harvesters)
- Tensions between village leader and villagers
- Interest conflicts between male and female farmers
- Conflict between water managers and the farmers who do not submit their water fee

Inter micro-micro conflicts

- Conflicts between different villages over natural resource management and use

- Mistrust between township government officials and farmers
- Disputes over competence for water management between farmers and fish farmers
- Social tensions at village level following the arrival of the iron factory
- Lack of co-operation between different villages in resource management (maintenance of Huangjiazhai irrigation system, for example)

Micro-macro conflict
- Imbalances of power in natural resources governance, creating mistrust between line ministries and farmers
- Tensions between the expectations vested in 'self-organisation' at village level, and the roles of the party and local government administration; and, powers of local government to contract to other parties the use of natural resources (for the businessmen's private profit and the township's revenues), that are in fact already used by villagers (for their livelihood)

Macro-macro conflict
- Difference in approach and orientation between the GAAS team and government (community-based approach vs. top down approach)
- Contradictions between economic development and environmental protection, and between short term income growth and longer term natural resource sustainability
- Conflicts of interest between line ministries over natural resource management
- Tensions from rapid socio-economic changes related to the shift from subsistence to cash economy

5.7.2 Involvement of stakeholders in the CBNRM practice

The GAAS team aims to promote CBNRM for the purposes of managing natural resources more sustainably. CBNRM is a participatory natural resource management approach that seeks to involve all those with a stake in the decision-making concerning natural resource use and management. It aspires to address China's national policy concerns of environmental protection, poverty alleviation, and equity, under conditions of social harmony. CBNRM assumes the active participation of stakeholders, especially the local resource users will come to understand better the inter-dependence among their particular interests and concerns. It is assumed in addition that the methods of inter-action and dialogue around actions that address the management of resources in which all parties have a stake, can effectively bring these divergent interests and concerns toward convergence around a shared natural resource governance regime. Thus, CBNRM more or less forces action researchers to undertake stakeholder analysis.

An early challenge for the GAAS team, as mainly natural scientists, was to recognize and try to understand the complexity of how different people and social groups within and outside of local communities may negotiate and access resources, and

how social and power relations govern different people's access to, use of and control over forest, water, and grassland resources. The understanding gained led the GAAS team to find out more about existing or potential conflicts of interest between different stakeholders, within and between different levels of natural resource governance. Their analyses of these interests, and of the specific ways in which people exercised their stake-holding in particular circumstances, were fed into the facilitation by the GAAS team of communication and negotiation among the stakeholders concerned.

As mentioned in previous chapters, the main objective of Phase I and II of the CBNRM project was to develop community institutions and build farmers capacity for sustainable natural resource management, therefore, the GAAS team's facilitation effects focused on involving different groups of farmers, such as woman and man farmers, the poor and the relatively rich farmers, and different ethnical groups of farmer (Buyi, Miao, and Han) in community in problem diagnosis regarding natural resource management and action planning so as to address the interests and needs of marginalized groups like women, the poor and minority in the actions. Facilitation also focused on helping in clarifying clear use rights of the resources, setting up management groups, making rules and regulations, and building community-based platforms for negotiating, agreeing, monitoring, and reinforcing rules for regulating access and sustainable use of natural resources.

From the end of 2001, the GAAS team has been trying to scale up CBNRM in Guizhou Province (Phase III and IV). On the one hand, the GAAS team cooperated with different line ministries of Changshun county to integrate the CBNRM approach into with government projects and programs, termed as vertical scaling up. On the other hand, the GAAS team closely worked with Kaizuo township government to expand CBNRM to more communities. The facilitation therefore shifted its focus to developing partnership among stakeholders (farmers, line ministries, township government, and private sectors). The facilitation activities included platform building for communication, negotiation and agreement reaching; coordinating agreement implementation and conflict management; providing training on CBNRM principles and methodology to stakeholders especially the government officials; and as well as building trust among stakeholders and fostering synergy. We learned that to be a true change agent, in the sense of trying to do things differently and getting people to relate differently to each other is always painful, in the sense of implying changes in power and authority relationships. I will return to this point in the following chapters.

These efforts have shown some good results at local level but the impact at higher levels is scarcely to be seen. Why is this so? The GAAS team had assumed that the county project office could coordinate the work of a line ministry to some extent, but the team has learned that the interests at the county level constrain the exercise of such control, and moreover that the county leaders' coordination role is not sufficient. County leaders are always busy, pulled by diverging interests, and they cannot commit to being available when they are needed. More importantly, the line mini-

stries receive set tasks from the higher levels of their ministries and receive project funds directly from these higher levels. Given this fact, the county government can do little about competing claims on natural resources. This issue cannot be addressed at county level, nor can it be resolved 'on the ground' solely at the level of township or the communities. Township officials are more directly appreciative of the potential of the CBNRM approach and this allows for the creation by an agency such as GAAS of more face-to-face interactions with farmers, and direct involvement in by township officials in issues of natural resource governance. They are closer to farmers than country officials and more accountable to them in many ways. As a result, shared critical reflections on a common purpose and the actions to take, follow more easily. These points will be further elaborated in the following chapters.

Beck and Fajber (2006) point to the complexity of interactions between people and their environment as in itself problematic; conflict and its resolution feed on the complexity. The GAAS team has concluded that unless CBNRM practitioners make an attempt to understand this complexity, they will usually get things wrong when trying to intervene.

6 Dynamics and impacts of the CBNRM research in Dabuyang

This chapter presents the result of the case study about how the CBNRM approach was practised in Dabuyang village in common-pool natural resources, namely forest, grassland and water resources. The general profile of Dabuyang is given at the beginning and followed by a brief review of the history of natural resource management in Dabuyang over the last 50 years. The in-depth case study reveals the challenges the Dabuyang villagers have faced since the introduction of the HCRS, and describes how the GAAS team worked with the villagers to develop local institutions for collective action for the sustainable management of the natural resource base. It has three main sections that deal respectively with the management of forestland, grassland and water resources. It concludes with an analysis of the implications for facilitating a transformation from open access to community-based managed resources.

6.1 General profile of Dabuyang

Dabuyang is one of the 37 natural villages in Kaizuo township, Changshun county of Guizhou province. It has 64 households with 300 people (in 2006). It is a middle size village in Guizhou in terms of the number of households and population. From its history book [4], we learn that Dabuyang ancestors migrated from North to Southeast China (e.g. today's Jiangxi province) and then to the current village about 200 years ago. They were the first newcomers to Kaizuo, occupying the most favourable location: the flat fields (to be used for rice cultivation) with fertile soil, the abundant forestland surrounded by good water sources and grazing lands. Dabuyang is a minority village made up by one Miao household and 63 Buyi households (Field notes, January 2006). The largest clan in the village is Ban; among the 64 households, 46 belong to the Ban. Like other minority villages in Guizhou, Dabuyang residents live in a compact pattern (originally, this pattern was established to prevent attacks by outsiders). Most of the households live in an area of less than 4000 m^2. Only in recent years, some households have built new houses outside of the village, along the main road to the township.

The Buyi are among the earliest migrants to Guizhou. They have their own language, clothing style, values, and customary traditions of managing village affairs and natural resources on which they rely for their livelihoods and survival. However, nowadays, those traditions are changing a lot as outside interventions increase.

4 History book is a commonly practised tradition in China to record the history of a clan or family from generation to generation. From the history book, one can trace the origin and development of the clan or family.

FIGURE 6.1 Land use of Dabuyang (Source: The GAAS team, 2005b)

Dabuyang has a land territory of 7213 mu (1 hectare equals 15 mu), of which 1900 mu are forestland, 3700mu grassland, 834mu cultivated arable land, and the rest are rocky mountains and hills (Kaizuo township, 2006). Dabuyang has abundant natural resources, compared with the provincial average. Taking arable land as example, the per capita arable land of Dabuyang is 2.95 mu, measured in 1995 (Chen, et al., 1995), but only 0.83 mu for the provincial average in the same year (ibid). Among Dabuyang arable land, 57.6% is paddy and 42.4% is upland. Only 423mu paddy fields are irrigated, the rest of arable land is rain-fed.

The Dabuyang villagers mainly rely on agriculture. Rice, maize and rapeseed are the main crops. Rice is the staple food and also the main income source of the local farmers, accounting for 49 % of the total income in 1995 (Chen, et al., 1995), and about 70 % of the total in 2005 (Field notes, October-November 2005). Maize is planted as feed crop. Rapeseed is an oil crop, mostly for household consumption. Buffalo and cattle are the important draught animals for Dabuyang farmers. There are at least around 150 buffaloes and cattle in the village at any given time, and 300 at the most.

The buffaloes and cattle are grazed on the hilly rangelands of the village. Pigs are commonly raised, and each household has at least one pig for household consumption and manure collection. Other pigs are raised and sold to obtain cash income.

FIGURE 6.2 Topography of Dabuyang (Source: The GAAS team, 1995b)

The formal educational level of Dabuyang farmers is very low with 28.7% of the population illiterate, 44.6% with a primary school education, 22.4% with a middle school education, and 4.3% with a high school diploma (Chen, et al., 1995). Only two persons obtained a university degree during the period from 1995 to 2006 (Field notes, July 2006).

Dabuyang is located in the centre of Kaizuo township (see Figure 2.5), near the main road from Guiyang to Guangshun, a big town of Changshun County. There are five buses a day between Guiyang and Guangshun. Dabuyang is only one kilometre south of the township. There is a combined primary and middle school and a small

hospital in the township. A local market is also located at the township site, which opens every Friday. Farmers sell their products and buy their groceries and agricultural inputs mostly at this local market.

6.2 History of natural resource management in Dabuyang

Dabuyang's natural resources, including arable land, forest, grassland and water have been managed under different property right regimes and institutional arrangements. This paragraph presents the radical changes in natural resource management in Dabuyang from 1950 to the present.

Clan period

Before 1950, when Dabuyang was liberated, arable lands were privately held, and intensively cultivated by individual households. However, most forests and grasslands were owned by the clans (mostly Ban and Chen), but could be used by everybody in the village and even by the villages nearby. People were free to graze their animals on the clan grasslands. People were allowed to collect firewood, mushrooms, herbal medicines and other non-timber products from the forest only for household use; selling was not allowed. Cutting trees for tools and building houses needed to be reported to clan heads in order to obtain a permit. Normally, such permits would be given; the reporting was just procedural. Due to the low population, of 35 households with 180 people in 1950 (Weng, et al., 1995), and an undeveloped market, the forests and grasslands were kept in good health, and no conflicts over resource used were recorded. Behind the village, there was a 10-hectare holy forest (locally called fengshuilin) situated on two small hills, which were collectively owned by the whole village. These hills were the place where the local villagers worshipped. They believed that fengshulin is the place where the gods resided. All of the plants and animals that inhabited fengshuilin were considered to be companions of the gods or living things in the gods' gardens. The forest was said to be guarded by the ancestral spirits. Animals, plants, land, and water sources within it should not be touched. Gathering, hunting, wood chopping, and cultivating were strictly prohibited. The villagers believed that such violations would make the gods angry, and that misfortunes and disasters would be brought upon them as 'punishment'. These punishments could take many forms, including diseases, floods, fires, and plagues of insects. It was, therefore, in the villagers' interests not to violate the sanctity of fengshuilin, but to present regular offerings in the hope that the gods would be pleased and thus protect their health and peace.

Dabuyang has two spring wells. Originally, villagers assigned the small one for human consumption and the big one for animals, washing clothes and irrigation. Drinking water was sufficient all year round, but collecting water every day was a major burden, especially for women. To keep the small well clean, Dabuyang villagers set rules (unwritten) to restrict villagers to use the well for purpose other than

getting water for human consumption. Dirty water containers could not be used to take water from the well. Animals were not allowed to be present. If anyone did not respect the rules, he or she would be punished by cleaning the well and apologizing to the whole village for his or her behaviour. According to the villagers, nobody violated the rules. Dabuyang had a big wooden mill wheel system that consisted of 12 wheels to take water from the big spring well for irrigation. It was driven by manpower. The mill wheel system had been built by the Ban clan in 1941. The mill wheel was free for the farmers in the village to use, but the families of the Ban clan had priority use. Farmers built small canals to lead the water to their own fields.

Commune period

In September 1958, the Kaizuo Commune was founded, consisting of four production brigades that made up thirty production teams. Dabuyang was one of the production teams of the Kaizuo production brigade, the Kaizuo people's commune (Field notes, November, 2004). As a production team, Dabuyang village was responsible for the coordination of production, and allocation of labour and income. It undertook independent accounting, being responsible for its own surpluses or deficits. Thus Dabuyang village collectively managed the cultivated land, forest, grassland, water sources, irrigation facilities, animals, agricultural implements, and was responsible for agricultural production and natural resource management for both the state and for itself. Dabuyang villagers were organized in a team, and followed instructions from the Kaizuo Commune, such as what to plant in the fields, what animals to raise, what and how much products should be given to the state, how much timber should be provided and how much coal should be produced etc. This form of collective ownership cannot be seen as real common property, because the villagers could not decide how to use the resources for their own livelihood improvement. During the commune system period, Dabuyang was instructed to produce tons of coal and provide thousands trees of timber to support the industrial development of the 'New China'.

In the period called 'The Great Leap Forward' (1958-1960), Dabuyang's forests were dramatically destroyed in the crazy steel production campaign all over China. Thousands of huge trees in natural forests were cut as fuel for steel production. The elders recalled that there were 11 steel-making stoves in Kaizuo, with one in Dabuyang. In order to feed these stoves, every day the villagers used detonators to cut and break trees. In that year, almost all the natural forests of Dabuyang were burnt in these stoves. Wild animals have been hardly seen since then. Ironically, the produced 'steel' turned out to be nothing more than a pile of trash iron! Customary rights for forestland were delegitimized and supplanted by the institutional system of the people's communes. The religious activities in the holy forests were considered culturally backward, and ordered to be stopped. The holy forests of Dabuyang and other villages of the township were also swept away during 'The Great Leap Forward' movement.

During the commune era, Kaizuo commune built 15 irrigation pump stations. One of them was built in Dabuyang. Before that, as recounted above, Dabuyang farmers used

a manpowered wooden mill for irrigation. In the early 1950s, the mill wheel was taken over by the Dabuyang cooperative, and in 1958 by the Kaizuo commune. It was assigned to the Dabuyang production team only in 1970, when Dabuyang was provided with a water pump powered by diesel oil. A small pumping station was built and a 200 meters long canal constructed. By that time, a total of 273mu farmland was irrigated. The irrigation system consisted of the pump station (a small one-room house with the pump inside), water pipes and the canal. It was the property of the Kaizuo commune, but managed by the Dabuyang production team. One farmer technician was trained in each village where a pump station was built. The farmer technician was assigned to take care of the irrigation system and operate the pump station for the production team, following the instructions of the production team leader.

Household Contract Responsibility System

In Dabuyang, arable lands were distributed to individual households with the following considerations: number of household members at that time (in 1981), fertility of land, distance to the village site lot, and access to irrigation water. Under this distribution the farmland became fragmented: 57.4 ha of total arable land were separated into 818 pieces, with an average size of 0.063ha. The smallest plot today is only a tiny 0.0003ha (Chen & He, 2000). Uplands are mostly far away from the residences, scattered in an area 1 km wide and 3 km in length. One farmer household in Dabuyang has 1.3 ha of arable land, but it is separated into 13 places with a total of 18 pieces of land (ibid). In order to ensure that farmers are motivated to continue to take good care of farmlands and ensure farmers having basic living assets, the central government made a decision to continuing the HCRS for 30 years, no matter whether the number of family member increases or decreases. It is thus stated in Article 3 of Chapter 2 in the Rural Land Contract Law of People's Republic of China, which was enacted on March 1, 2003.

At the beginning of the HCRS, Dabuyang's forests were allocated to individual households, except for the holy forests kept with the village collective. But the farmers did not take responsibility to properly manage the contracted forests. They cut trees, encroached forestlands, and burned forestlands for potassium grass-ash. Two years later, realizing the deteriorating situation, the Dabuyang elders urged the village leaders and villagers to stop the household contract forest system. Dabuyang decided to take the forests back from the individual households, and then evenly allocate them to seven groups of villagers with 7-9 households in one group. However, this new management arrangement did not work better because the benefits for management responsibility were not clearly defined. As a villager remarked: "For the good of our village, I would not allow outsiders to cut trees, gather firewood and grasses; but I did not know what I could get from stopping my village mates to cut trees in the forests. I do not want to offend them." (Field notes, January 11, 2005) In 1995, when the GAAS team started the CBNRM project, there were very few useful trees in Dabuyang's forests left, except in the holy forest.

The grassland in name belongs to Dabuyang, but in fact it was open to everyone. After HCRS was adopted, Dabuyang's water pump was kept in the hands of the farmer technician, although the pump belonged to the whole village. In the dry season, farmers took turns in borrowing the pump from the farmer technician for their field irrigation. Because the pump belonged to all households, yet was used by individual farmers, nobody really took good care of it. It did not take long before the pump was broken. The station house lacked necessary maintenance and collapsed. Farmers took the bricks of the collapsed house for their own use.

6. 3 The CBNRM research in Dabuyang: dynamics and impacts

In 1995, with the support of the International Development Research Centre of Canada, (IDRC), the GAAS team initiated a CBNRM research project in Kaizuo Township. In Phase I (1995-1998), the research involved two communities. Dabuyang was one of them.

We have discussed the CBNRM framework in Chapter 2. I only highlight the main features here.

The research in Dabuyang was focused on the facilitation of community-based institution building. Activities included measures to clarify clear use rights of the resources, the setting up of management groups, and the making of rules and regulations based on customary norms. The research team mobilised villagers to undertake collective action. Villagers contributed their time, labour and money; they took responsibility to manage their common-pool resources such as forest, grassland and water systems, the village road, and a village development fund.

At the beginning, the GAAS team conducted a participatory rural appraisal (PRA) in Dabuyang. The direct output of this activity was a 'natural resource management plan for village development (NRMP)'. But more importantly, the NRMP served as a mean to engage the farmers and to create opportunities for interaction. The GAAS researchers together with farmers agreed to (1) examine the situation of natural resource management, with a focus on forest, grassland, water resource and water-related facilities; (2) identify problems related to natural resource management; and then (3) develop an action plan to address these problems. The farmers were very interested in being involved in the actives and were very active in this process. This was a totally new approach to planning for both the farmers and GAAS researchers. The traditional way of planning was done by experts and government people. As a middle-aged farmer who took part in the process, remarked: "That was the first time in my life to make a plan for our village and make decisions by ourselves for village affairs." (Field notes, December 22, 2000)

The GAAS team used such PRA tools as 'community mapping', 'resource mapping', focus-group discussion, and village meetings. The farmers drew their houses, fields, roads, forest, grassland and water points and so forth, on maps, and also presented on the maps the problems related to natural resource management. With the help

of these tools, the planning became a process of joint learning: together, to do a diagnosis of natural resources, identify issues, and develop a concrete action plan to address the issues. During the process, farmers' concerns, interests and knowledge were taken into account. The farmers were very motivated to interact with each other and with the GAAS researchers. One of the township officials was also invited to participate in the planning activities. She was surprised and amused by farmers' knowledge and ideas. The identified problems and action taken for the management of forest, grassland and water resource are presented below.

6.3.1 Forestland management

Management institution building

Dabuyang had 1875 mu forestland, which consists of 36.4% wood forest (both natural forest and planted forest), 50.8% shrubs, and 12.8 sparse wood forests (Chen, et al., 1995). Forest products have not been a major income source, but they play very vital roles in the livelihood improvement of Dabuyang villagers. They go to the forest for the collection of firewood, wood, non-wood forest products (mushrooms, herbal medicines, vegetables) mostly for self-consumption, but some for the market. After the commune era, the forests became the common property resource of the village. It seemed that everybody in the village had use rights; but it was also expected that everybody should take responsibility to look after the resources. In reality, everybody used the resources, but nobody took care. Villagers interviewed by the GAAS team about this practice, mentioned that in those days, taking care of collective resources was seen as offending others in the village and nobody liked to do this. There was no management mechanism to decide why/who/what/where/when/ how the forests would be protected, used and planted with new trees. Lack of community institutions for sustainable forest management was the biggest issue raised during the NRMP planning process. Farmers realized they needed to work out a set of rules and regulations to manage their common resources; otherwise they could not change the situation of resource degradation. Following lengthy and sometimes difficult discussions, all farmers agreed to set up management regulations (Box 6.1). GAAS researchers coordinated these meetings, facilitated the discussion process, gave suggestions and necessary advice, and sometimes moderated disputes among farmers. As the planning process was going on, detailed regulations were finally worked out. This process took half a year.

We, Dabuyang village, are abundant in forestland resources. For current benefits and for the benefits of future generations, all the villagers should take responsibilities and obligations to protect and use them well, like we use the arable land. Therefore, we have made the following regulations:

1 Forestland resources belong to the collective. There are three management forms: collective management, contract management of the individual,

contract management of group consisting of several households.

(1) The holy forestland is collectively managed. Nobody is allowed to touch it.
(2) Water conservation forestlands near the hamlet are managed by the collective, and all the income derived from these forestlands belongs to the collective. Trees over one meter in diameter can be cut only when the collective deems this necessarily for the public welfare. Trees are forbidden to be cut for the villager's self use.
(3) Forestlands with dense wood situated near the hamlet are divided to the household to manage through a contract. The contract term is valid for 50 years and can be inherited by future generations. The household has the responsibility to afforest and the right to deal with the forestry products. When they cut the trees on their own contracted forestland, they must get the consent from the village head and from the township forestry station. They also have to give 10 percent of the timber value as a management fee to the village according to the market price at that time.
(4) Forestlands with sparse trees, forestlands with shrubs and wastelands suitable for afforestation can be contracted to the household (or small group) according to the principle 'bid for contract, develop on large scale'. The contract term is 50 years. The collective asks for a 15% management fee at the moment when the forestry produce is sold.
(5) For the purpose of large scale, effective management, and the increase of efficiency, the household can transfer the rights of management, as well as the rights of dealing with products, to other households based on the consent of the village. The village guarantees bilateral legal rights and interests.

2 Handing out the rewards and punishments, strengthening the protection and management of forestland resources.

(1) Stealing trees from the collective forestlands and household contracted forestland is forbidden. Whoever steals the wood will be fined, 10 RMB for small trees (below 1.3 inches in diameter), and 10 RMB for each tree of an additional 1.3 inches in diameter; 10 RMB for each bundle when collecting firewood.
(2) Activities such as grazing, pruning, burning for ashes, and collecting pine needles are forbidden in the collective forestlands.
(3) Reclaiming in the forestland is forbidden. Whoever disobeys this regulation will be fined 50 RMB and must afforest in time, or else, the forestland will be taken back and transferred to other households.
(4) Setting fire is forbidden. Once a fire happens, all the villagers (aged from 16 to 60 years) have the responsibility and obligation to extinguish the fire. 20 RMB will be fined each time for being absent on

purpose. After extinguishing the fire, we will investigate the reason and person responsible. The arsonist will be fined over 100 RMB. Those who cause great damage will be sent to the township police station and dealt with according to the Forestry Law.

(5) Contracted households who report the above phenomena, will receive 70 percent of the given fines mentioned above, the rest will be given to the managers. If other persons report on these infractions, they will receive 40 percent of the fines; 30 percent will go to the contracted household (or the collective), and the remaining 30 percent to the managers.

3 Organizing the Forestry Management Committee to carry out management measures
On the basis of the contract group, two persons from each group who are just and responsible are elected. The total number of persons making up the Committee will be ten. The Committee has one chief, and one vice-chief. The responsibilities of the forestry committee are:

(1) Managing the collective forestlands, and organizing the villagers to manage the forestlands not under contract.
(2) Taking the responsibility to develop a forestry plan. Assisting the Villagers Committee to organize all the villagers to afforest and to extinguish mountain fires.
(3) Dealing with the respect for forestry rights. Handing out rewards and punishments. Taking care of the fines.
(4) Organizing the villagers to study the relative forestry law and regulations. Educating the villagers to abide by the law and manage the forestland resource well.
(5) When the committee encounters a difficult problem, the problem must be reported to the Villagers Committee to be solved.
(6) 30 percent of the income from the collective forestland and related fines are to be used for the payment of the wage of the managers.

4 These regulations takes effect from the day the Villagers Meeting agrees with it.

BOX 6.1 Forestry management regulations of Dabuyang. (Source: Dabuyang village, March 1996)

From paper to practice: an account of selected events marking the actual management of forest resources

The villagers agreed that the new regulations were followed well. There was no violation of the regulations. Fifty thousand new trees were planted during the first two

years. However, a new issue emerged after two years of practice of the forest management regulations: the remuneration of the village forest managers. They had hardly gained anything since there was little short-term benefit from the young forests and few fines were handed out for irregular forest management. As a result, the managers lacked an incentive to manage the forests.

Moreover, because Kaizuo is situated in the watershed of the Pearl River and Yangtze River, it had been included in a so-called watershed management zone. The state forest policy became stricter after 1998, because of the big flood in China in that year. In the watershed management zone, cutting trees is strictly controlled. A wood checkpoint was set up in Kaizuo Township in 1999. When the Natural Forest Protection Program was implemented in 2000, logging in natural forests was banned. Selling trees and changing forestland to other uses was forbidden. Cutting trees for household use, no matter from the village forestland or from farmers' backyards, needs first to be approved by the forest station in the township. Under this condition, farmers obtain little economic benefit from tree planting and forestland conservation. They have obligations to plant trees and protect the forest, but have limited right to harvest. Thus, remuneration for the village forest managers became very difficult. They had little motivation to implement the regulations.

Although the logging ban policy and quote policy has been strictly implemented by the Kaizuo forest station of the Changshun Forest Bureau, the lack of manpower makes it difficult for the station foresters to prevent illegal tree cutting and forest fires. In the autumn of 2000, a fire occurred on one piece of the Dabuyang forestlands. About 160 mu of forest was damaged. It was said that the fire spread out from the forest of the village bordering Dabuyang. It was also said that the fire was caused by someone burning the forest to obtain the ashes for use as potassium fertilizer. However, nobody knew for sure who did this.

Incidences of tree stealing began to occur once again in the forests of Dabuyang village. When this happened, the farmers realized that by relying only on the government forest protection rules and its enforcement, they could not achieve sustainable forest management. They realized that the village forest management regulations should be continually practised. The farmers still had expectations that some day in future the government would change its forest conservation policy; for example, change the logging ban to a form of controlled logging. They also had developed good awareness that the forest is important for their environment. They wanted to keep a healthy environment for their children. They had suffered serious soil erosion and floods when their forests were damaged. But they first had to solve the problem of the managers' remuneration.

At that time, the GAAS team was present to conduct a participatory evaluation of the CBNRM project. In the evaluation meetings, the issue of the managers' remuneration was raised. Villages involved in the project shared their experiences about natural resource management in one of the evaluation meetings organized by the GAAS team. The story of Dongkou village inspired the Danbuyang villagers. Dongkou village has a traditional way to manage their village affairs. They divide households into

groups; seven households form one group. One family member (man or woman) from each household then forms a management committee. The committee members are called locally 'niutou'. 'Niutou' take the responsibility to manage village affairs, including enforcing rules, handing out fines, and managing conflicts between villagers. At the end of each year, a village gathering takes place. The 'niutou' inform the whole village how they managed the village affairs in that year. Then they use the money from the fines of rule violators to have a big dinner in the village. This helps to leave behind all the conflicts and unhappiness that has occurred during the year. No one feels offended by being punished for improper behaviours. Then, they all make a new beginning, and the management tasks are handed over to another group of households. This traditional practice has been exercised for a long time in Dongkou village. They think that it is an effective way to enforce rules and regulations. Each household has equal rights and responsibility in the village's affairs. They are accountable to themselves and the common good of the village. No payment is needed in this system. Each term, the new team of 'niutou' tries to do better than the previous team. The GAAS researchers encouraged Dabuyang to experiment with this practice. In fact, Dabuyang has practised a similar system in their religious matters: households in a group take turn to worship their common ancestors (or Chairman Mao - the founder of the New China). When they recalled this, Dabuyang villagers easily adopted the method to manage their own forests.

The intrusion of industrial interests

In order to promote local development, Changshun county has recently decided to develop its industry. Industry makes a much higher contribution than agriculture to the county's revenues. All the townships of the county are encouraged to look for industry projects or for the start-up of private factories. The amount of revenue contributed to the county has become a performance criterion of the township governments. Therefore, township governments are taking every chance to attract factories and enterprises. With the efforts of Kaizuo township and the Bureau of Trade and Investment Attraction of Changshun county, an iron factory and a coke factory moved to Kaizuo in 2005. This occurred without any consultation with local farmers. The factories are located 2-3 kilometres north of Dabuyang. The government promised to obtain stronger electric wiring for the factories. As originally routed, the wire would pass through one of Dabuyang's forestlands. The township requested Dabuyang to cut the trees along the planned route along two meters wide and 100-meter long stretch.

Traditionally, such a request from the local government amounted to an order to the farmers. This time though, Dabuyang did not do as the local government asked the village to do. The Dabuyang leaders called a meeting to discuss the order. First, they stopped the workers who were installing the wire poles in the forest. Then they went to the Forest Station and to the GAAS team to ask for support. The farmers, Forest Station foresters, and GAAS researchers together prepared a protest paper, which was given to the Kaizuo township, Bureau of Trade and Investment Attraction,

Forest Bureau and the County government. The paper stated that it was not correct to act contrary to the central government's forest management policies. Industrial development and revenue generation should not be at the expense of the environment and of farmers' interests. This time the county leaders responded in a timely manner. A week later, technicians were sent to the site and redesigned the route. Compared to 1995, when the CBNRM research started, the farmers now have more awareness of their rights and a better understanding of the government policies. They also have a stronger capacity to use policies to protect their rights.

Farmers also complained that the coke factory releases smoke, which is harming their forests and crops. But no action has been taken so far, because the damage to crops and forests has not been visible. Not all farmers are aware of the harmfulness of the smoke. In a regular meeting between Kaizuo township officials and the GAAS researchers, the researchers raised this issue. The officials responded that they had heard the farmers' complaints, and had urged the coke factory to take measures to clean up its act. One of the township leaders told the GAAS researchers in confidence that they did not want this kind of heavy industry factories in Kaizuo. They are not getting any share of the revenue generated by the factories yet. But the county government wants to increase revenue, and it is one of the indicators to measure their performance.

Kaizuo township officials thus sometimes are under pressure to do things they actually do not want to do. The GAAS researchers decided to bring this up with the county government. The county leaders told the researchers that they also did not like to have this kind of factories that pollute the environment, but they said that right now, they had no other choice. They have to find money for the salaries of teachers, doctors and government staff, and for operational funds of the county government and the township governments. They have to follow the principle of 'development' first, environmental protection second.

The case of Camellia

Camellia is a popular wild oil plant in Dabuyang forestland. It was the main oil plant source for the local farmers. Dabuyang had a rule for harvesting Camellia fruits: nobody was allowed to harvest before September 1 of the lunar calendar. Dabuyang villagers harvested the fruits on September 1 and 2, for two days. After these two days, people from other villages were also allowed to harvest the rest of Camellia fruits in Dabuyang's forests. This customary rule had been followed by generations. After each harvest, farmers would prune the Camellia trees, and clear the plants nearby. The Camellia trees were kept healthy and productive. But the situation changed in the 1980s when rapeseed was introduced in Kaizuo. Rapeseed is planted after the rice harvest, in the same fields. It significantly adds to the value of paddy fields. The rapeseed has much higher yields than Camellia, and is easier to process. Very soon the rapeseed became the major oil plant. Since then, farmers have been paying little attention to the Camellia plants. They now cut Camellia for firewood, for tools, but do no more pruning. They do not care who harvests fruits nor when.

As a result, the area of Camellia has been shrinking rapidly. This story shows that a new technology can affect traditional institutions of resource management. Sometimes, the influences are very strong, and it seems that no one can do anything about it.

6.3.2 Grassland Management

Dabuyang has a relative large area of natural grassland compared with the surrounding villages. The area of grassland is about 3700mu. The grassland is located in a small valley surrounded by hills and mountains. There are several water points in the valley for animals. The biggest water point is a spring pond that has never dried out even in a severe drought year. It is the most important water source in the grassland for animals.

Dabuyang's grassland has been used as a common pool resource. After the commune era, the grassland was collectively owned by the village. Each household in the village could use the grassland freely. Before 1996, each household had 1-2 buffalos or cattle; the total number of animals was around 100. Compared with the grassland area, the number of animals was not so high. Villagers could add as many animals as they wanted. Sometimes, buffaloes from other villages were also grazed on Dabuyang grassland. Nobody in Dabuyang cared about it. They thought their grassland had more than enough grass for more animals. In fact, Dabuyang grassland had no management at all. It was an open access resource in a true sense.

In 1995, when the GAAS research team started working on CBNRM in Dabuyang village, every day one family member (normally a woman or an elder or a child) from each household had to watch over the grazing animals. It was very labour intensive. Normally, villagers would send their animals to the grassland, then go back home to do other things or to the field to do farming work. Sometimes, animals would escape from the grassland to a nearby farm field and eat the crops. This kind of events created conflicts between villagers. In order to avoid crops being damaged by animals, farmers cut wood from the forest to fence their fields. Each year, the fences demanded the use of a lot of wood. This was also a threat to the forest.

Collective grazing as a solution

To solve these problems, the GAAS team put forward an idea for an experiment on collective grazing in Dabuyang. At first, villagers had no confidence in this idea. Several concerns needed to be addressed: (1) How to manage the collective system effectively, with low cost? (2) How to manage the system fairly with regard to the fact that each household had a different number of animals, and the number of animals was not fixed all the time? (3) How to make sure animals would not lose weight because of collective grazing, and at the same time that the grassland would be maintained properly? These concerns were discussed among villagers and GAAS researchers. As the discussion went on, the women farmers showed greater interest to try a new way of grassland management.

With the encouragement of the GAAS team, the women decided to experiment with

collative grazing. As the planning process was going on, they found the time schedule for household rotation was difficult to make, because different households had varied number of animals. How to decide how many days each household in the village should graze the animals with different households having different number of animals? How to rearrange the schedule if householders added or reduced the number of animals? These questions might be simple to a mathematician, but was not easy for many people. The GAAS researchers also tried to figure these questions out. However, a few days later, the Dayuang women told the GAAS team that they had found the solution. They divided themselves into groups; each group that had six people, with one from each of the six households. Among the six people, two took care of cattle and four took care of buffaloes (according to the farmers, cattle went further up hills or mountains, while buffaloes were at the lower parts of hills or mountains). Each group was responsible for grazing the animals for one day out of 28 days. The composition of group members might change every day according to the number of animals held by each household. For example, if one household had one animal (or two, or three animals), this household would graze one day(or two, or three days) every 28 days. Even though till now the GAAS researchers and other visitors have been puzzled by this arrangement and wondered how the Dabuyang women worked it out. But the Dabuyang villagers thought this arrangement was reasonable and fair.

FIGURE 6.3 Collective grazing (Photo: Yuan Juanwen)

At the request of the government, each natural village has a woman leader, who is

elected by the women villagers. She assists the local government in family planning, women's health care, organizing women for agricultural technology training etc. The woman leader of Dabuyang was selected to be in charge of grazing group shifting arrangements. Together they decided that any change in the animal numbers and group arrangement would be announced on a big wall in the village. The grassland was divided into several areas, and each day they grazed the animals in a different area. Every morning, the villagers sent their animals to the village entrance and collected them back in the evening. This system was named 'tuoniusuo', meaning animal kindergarten. Rules were made for animal loss, injuries, and crop damage by animals, etc. The villages bordering to Dabuyang were informed not to graze their animals on Dabuyang's grassland.

Up to this day, the collective grazing system has been functioning very well. They have shown that they save a lot of labour. Dabuyang has 64 households. Each day, the whole village only needs six labourers instead of 64 labourers to look after the animal grazing. The saved time allows the farmers to engage in other farming activities and income generation activities such as seasonal construction work, the collection of non-timber forest products, cash crop planting, and pig raising. The number of animals has increased from 100 to 210 at maximum, and animals have become an important cash income for Dabuyang villagers. Conflict incidents (because of crop damage by animals) have significantly decreased. Fields no longer need to be fenced. Ten years have passed, and the collective grazing system still continues to work well in Dabuyang, even though it experienced some difficulties.

Learning about the pros and cons of black goat raising

In order to make good use of the grassland resources for income generation, the GAAS team discussed with villagers the possibility of adding animals. Technicians from Changshun county were invited to assess the capacity of the grassland. A survey of the grassland was done, and several discussions took place among villagers, the GAAS team and county technicians about what animals to add and how to manage the added animals. The technicians suggested raising black goats, because goats grow fast, have a strong market demand and a good market price. The decision was made in 1996 to introduce eight goats to the herd in Dabuyang. The GAAS team first gave the goats to a poor household (single-parent with three children). The plan was that each year this household would provide ten baby goats to other households in the village. In less than one year, the household gained around 1500 RMB from goat raising. At that time the annual per capita income was RMB 627.4 in Dabuyang (Chen, et al., 1995).

But when the baby goats were available, only two households wanted to raise goats, because they had realized that goats could not be grazed together with buffalo or cattle. The households would have to graze the goats by themselves. It would require more labour. And many villagers did not like the goats. According to them, the goats were threatening their grassland and other animals: goats eat not only grass, but also grass roots and shrubs. Villagers also observed that buffalo and cattle would not eat the grass that had been touched by goats. Villagers were not happy about it.

At that time, the GAAS team realized that a mistake had been made and that the best way to solve these problems was to stop grazing goats altogether. With the GAAS team's help, most of the goats were sold over the next two years. From this, the GAAS researchers learned an important lesson: introducing new agricultural technology, for instance, goat rearing, is not only about rearing technique or even the income potential but also about changing relationships between farmers in the community, and between villagers and their natural resources.

FIGURE 6.4 Black goat project in Dabuyang (Photo: Nong Renfu)

Coping with new challenges in grassland management

In recent years, as prices of seed and fertilizer keep going up, but the price of rice remains more or less the same, farmers' income has significantly decreased. At the same time, market demand for animal meat continues to increase, and thus animal husbandry is becoming an important cash income source for the local farmers. The number of buffaloes and cattle was increased rapidly in Dabuyang and in the surrounding villages. There are now about 300-400 heads on Dabuyang's grassland, with half of them coming from other villages. At the same time, Changshun has been appointed as 'Key County' for animal husbandry development of Guizhou Province. The county promotes animal husbandry development mostly by promoting the raising of goats. The Animal Husbandry Bureau of Changshun County provides goats to farmers at a very low price. One of Dabuyang villagers received 17 goats from the Bureau. Dabuyang villagers got upset about the Animal Husbandry Bureau's intervention. Businessmen also come to the village for fern sprouts. As

mentioned in Chapter 5, fern sprout is becoming a popular wild vegetable in cities. On Dabuyang grasslands there are plenty of fern sprouts in the spring, especially on the grassland hills. Four years ago, businessmen started to buy fern sprouts from Dabuyang villagers. Each year, Dabuyang villagers could collect about 10-15 tons of fern sprouts from the grasslands. Fern sprout collection is concentrated in a period of twenty days or more from late March to early April. Some households earn up to 1000 RMB from selling fern sprout in a very short time. At the same year, the per capita income of Kaizuo Township was only 2700 RBM (Kaizuo township, 2005). Selling is an easy and quick income generation activity, and is attractive to Dabuyang villagers. Fern sprout would grow more and better in spring if the grassland hills and mountains burned during the previous winter. Unfortunately, driven by the desire for economic benefits, some individual villagers set fires on purpose and in an uncontrolled way. This behaviour causes serious degradation of the grassland. The fern is becoming the dominant plant on the grassland, and the other grass species are disappearing (Zhang, et al., 2006).

Now Dabuyang farmers are bothered by new problems arising from this trend: (1) Animals from other villages entering Dabuyang; (2) The Animal Husbandry Bureau's policy of encouraging farmers to raise goats; (3) The increasing animal numbers in the village; (4) The burning of grassland for fern collection. These four problems are challenging Dabuyang grassland management and collective grazing system. Dabuyang villagers complain their animals do not gain as much weight as before because of insufficient grass on grasslands. They have thus started to discuss a revision of their grassland management rules.

FIGURE 6.5 Fern becomes the dominant plant on some parts of Dabuyang grassland (Photo: Zhang Zhulin).

Starting to revise grassland management rules

The revision process of Dabuyang grassland management rules started from a meeting held on October 21, 2005. The meeting was in the woman leader's house where normally village leader meetings are held. Three village leaders (the village head or zhuzhang, account or Kuaiji, and woman leader or funv-zhuren), six villagers (the former villager head, three women who were Animal Bank committee members, and another two men farmers who were considered influential in the village) and two GAAS researchers attended the meeting. The Animal Bank is a micro-finance grant supported by the CBNRM project, which is discussed in Chapter 8. The village head first briefly talked about the purpose of the meeting, then quickly opened the discussion. The village head was a young man and had been elected several months ago, and he was not used to speak in public. According to the villagers, he was elected because he had often complained about things in the village and obeyed the rules. So the villagers elected him to see how he could manage as the village head (Field notes, September 2005). It has been mentioned that most of farmers in Guizhou especially in the poor areas do not want to be the village leader because of the imbalance between responsibility and reward. The farmer participants immediately spoke out, with several people speaking at the same time. The village head tried to ask them speak one by one, but he could not manage it. At that time, the woman leader stood up saying to the people: "You people calm down! Let us discuss the issues one by one, and speak one by one. I suggest we first discuss how we can prevent the animals of other villages from entering our grassland." She then said to the young GAAS researcher: "Please help us to write down carefully what we discuss." The people started discussing again. The women leader is a middle aged Buyi woman. She received middle school education, which is very rare for a Buyi woman at her age. She had been the woman leader for years and the one to manage the rotation schedule for collective grazing (now this has become the responsibility of another farmer, because this task also needed to be rotated, according to her). She was quite influential in the village, especially among women, because of her willingness to work for the village and for always being ready to help others, being fair, not selfish, according to the villagers (Field notes, July 2003).

As the meeting continued, the woman leader helped the village head to facilitate the process whenever the village head could not manage the situation. The GAAS researchers observed and documented the process. Sometimes the researchers raised questions when they noticed the farmers ignored some issues in their discussion. For example, when the farmer participants discussed the measures they would take to prevent the animals from other villages, they were too much focused on 'physical actions' such as fining, or driving away, or using threats and so forth. Noticing this, one GAAS researcher asked them: "Do you consider what the situation will be if you take these actions?" One woman replied that it might lead to fights with other villages. There was a short silence after that. It was clear that no one wanted a fight or other forms of conflict with their neighbouring villagers. Then, the GAAS researcher asked another question: "Are there any better means other than the conflict

measures to solve this problem?" Following this question, the farmers discussed some of the peaceful actions, such as first informing the neighbouring villages about their decision about grassland management and to obtain their understanding. They also mentioned getting support from the township government in case there is a dispute with other villages on grassland use, etc.

In the meeting, the difficulty was to reach agreement on goat grazing. In fact, most of the villagers did not want any goat grazing on the grassland. But the participants did not want to offend the two households that had goats. One household was the woman leader's husband's old brother. She also felt it was difficult to say no to goat grazing in the meeting. However, the village head and another three villagers insisted on the idea to stop goat grazing. So the rest of the participants acquiesced with his idea. Learnt the lesson of previous goat-raising experience, the GAAS researchers understood the threat of goats to the grassland. They did not want the goats being grazed on the grassland either. But they did not explicitly give their opinion in the meeting. They wanted to see how Dabuyang villagers could handle the challenges.

The meeting lasted about three hours, and finally reached the following agreements: (1) To impose heavier punishments and patrols (one more task for the grazing group) to prevent the animals of other villages entering their grassland; (2) Dabuyang villagers would no longer be allowed to graze goats in the village grassland. The household who is raising goat would be requested to sell the goats within two months time; (3) The households who have more than X number of buffaloes or cattle, must grow feed crops of X mu for each animal; (4) Setting fires to burn the grassland would be forbidden (The GAAS team, meeting minutes, October 21, 2005). These initial decisions about the new grassland management rules need to be discussed and agreed by most of the Dabuyang villagers. Before the meeting ended, the GAAS researchers reminded the participants to find a date for a village assembly as soon as possible. They suggested to discuss before the assembly how to organize the meeting to avoid possible conflicts between farmers. The researchers also advised Dabuyang leaders to invite the township government officials to attend the assembly to discuss those four issues.

The village assembly

The village assembly was convened on November 27, 2005, after the autumn planting. The villagers gathered in the Dabuyang meeting room. Two GAAS researchers and one Kaizuo township official also attended the assembly. Before the assembly, the village leaders invited the GAAS team to facilitate the meeting. They assumed there would be quarrelling between farmers who had and did not have goats, and they felt it was difficult to manage the conflict situation in the meeting. For the purpose of enhancing the capacity of the township government in practising CBNRM, the GAAS team therefore asked the village leaders to invite the government official to facilitate the meeting, but the GAAS researchers promised to help if a problem would occur.

All the farmers participated in the meeting agreed with the idea of taking stricter measures to prevent animal grazing from other villages. This also gained support from the township government. However, for the goat raising issue, it was not so easy to reach agreement in the village assembly. The two farmers who had goats did not want to give them up. They argued that the county government (the Animal Husbandry Bureau of Changshun county) encouraged the breeding of goats, that the grassland belonged to everybody in the village, and that therefore, they were entitled to a share. There was no reason to ask them to stop goat grazing on the village grassland. During the discussion, one farmer blamed another farmer's goats for damaging his crops, arguing that the compensation for the damage was not sufficient. But the other farmer did not agree with what he said. At that moment some farmers became emotional: they started arguing, quarrelling, and shouting at each other. The village head tried to stop the dispute, but his voice could hardly be heard because of the noise.

At that moment, the government official beat the table heavily using his hand, asking the farmers to calm down. The GAAS researcher then explained that their quarrelling could not lead to finding solutions. The two farmers who had goats emphasised that the goat raising was supported by the government, they had rights to use the grassland. But the majority of the farmers considered the goats a threat to their buffaloes and cattle, as well as to the grassland. When the two sides insisted on their own ideas and no one wanted to give in, the woman leader proposed an idea to divide their grassland for goat and other animals. Finally, they managed to reach an agreement between the farmers who have and did not have goats. The agreement was that a certain area of grassland on the upper hills would be assigned to goat grazing. This piece of grassland is relatively far from other grassland areas and is separated by some shrubs. The farmers who have goats must graze their goats carefully to prevent the goats from entering other areas of the grassland. Otherwise, they would be fined. Both the GAAS team and the township supported this arrangement. Since then, separating grazing for goats and other animals has been practised in Dabuyang.

Later, during the People's Congress of Changshun County held on March 8-11 2006, the GAAS team and the Kaizuo Township proposed a bill for experimenting with feeding goats in a pen instead of grazing goats on common grassland. For a long time after the Congress took place, there was no feedback yet from the county. For the county, short-term economic growth was more important than ecological improvement. Then, one day in July 2006, a key leader of Changshun county visited Kaizuo township. GAAS researchers raised the issue again during the meeting. The leader remarked that the goat program was from the Agriculture Department of Guizhou Province. He said that he preferred to encourage raising other animals, cows for example, but could not use current project funds to do so. The county would first have to apply for a cow-raising program. He argued further that most of the time, the government programs are well-suited to Changshun's situation, but that the main problem is that there are no corresponding program sources from the

province or from the line ministries of the central government. He added that some programs are indeed not suitable for Changshun, but for those, they have to apply as well; an example is the goat program. Otherwise, he pointed out, other counties would receive the benefits from the program, and Changshun would have none. "Anyway", he concluded, "it was always better than nothing."

Among the GAAS team-members we had long discussions about these arguments. We decided not to include farmers who had goats in our small grant projects for income generation (micro-finance, for example). The purpose is to discourage farmers from raising goats. It has been shown everywhere in Guizhou that goats are a threat to sustainable grassland management.

For the issue of increasing animal numbers, most of the participants in the village assembly agreed to use a piece of village common upland to plant grass as a supplementary grass source to the grasslands. Dabuyang has about 10mu common upland, which was used for soil erosion monitoring practices by the Changshun Integrated Agricultural Development Program. The program ended a few years ago and the land has since been 'returned' to Dabuyang. However, it was not been immediately cultivated by Dabuyang villagers, because the village had not decided how to use it and who would use it. The villagers divided the 10mu land into five plots of two mu each. They have agreed that one household plants feed grass in one plot for one year, a total of five households per year. They are required to supply a certain amount of grass to all the buffaloes and cattle. This should be done in the morning before the animals set out to the grassland. The five households are also required to breed enough grass seed for the use by the five households that will take over the next year. This arrangement will start in 2007. The township will help them to get seed free of charge from the Animal Husbandry Bureau. This local arrangement will be closely and jointly monitored by the Dabuyang farmers, township officials and the GAAS researchers.

Regarding the decision of forbidding setting fires to burn the grassland, quite a number of farmers in the village assembly did not consider this uncontrolled burning as harmful for the grassland. They thought that the grass in spring would grow more and better if the grassland was totally burned in the previous winter. GAAS researchers explained that this was not true. Spring is the raining season. The average total annual rainfall of Kaizuo is about 1214mm, of which about 1037mm falls in April-September (Chen, et al., 1995). Sometimes the rains are very heavy. The grasslands in Guizhou, including those of Dabuyang, are mostly on the hills and in the mountains. Heavy rains easily wash away the topsoil of burned hilly grassland. The elders in the village also had something to say about this in the village assembly. They recalled that when they were children, the grass had been much denser and taller than nowadays. The efforts of the farmers and GAAS researchers have led to a new rule that forbids setting fire to the grassland.

Implementing enclosure of grassland from other villages

The village assembly has agreed and decided to enclose Dabuyang's grasslands from other villages, but how to implement this decision becomes an issue. Dabuyang has good relationship with its neighbouring villages, and some of the Dabuyang villagers have relatives in these villages. Moreover, open access is a traditional practice for grassland in Kaizuo, even in rural Guizhou. So Dabuyang villagers felt uneasy to use a formal way (such as written announcement) or official way (through township government or the GAAS team) to inform their neighbouring villagers that their grasslands would no longer be open to them. The Dabuyang village leader was even not willing to take responsibility to orally diffuse this news. He thought every one in the village had the responsibility to undertake this task. So he proposed that in the following week the villagers who were responsible for grazing animals would inform their neighbouring villagers who grazed their animals on Dabuyang's grasslands about their decision and explain to them that the limited carrying capacity of the grasslands could no longer support an ever increasing number of animals. He also suggested to tell neighbouring villagers that after one week, Dabuyang would take actions to drive 'outside' animals away. According to our field interviews, the neighbouring villagers were very surprised to learn about Dabuyang's decision, and of course, were not happy. They thought that even though there were boundaries on paper, in practice, the grazing areas had always been open to all for generations. They complained that before collective grazing started in Dabuyang, some of Dabuyang villagers had also grazed animals on their grasslands! (Field notes, January 2006). To deal with the new situation, many of the 'outsiders' moved their animals to other villages in Kaziuo where farmers still practise open access grasslands. Some however, did not care about Dabuyang's decision, and continued to drive their animals to Dabuyang's territory, where they were used to go to. Dabuyang villagers would again and again ask them to leave. But sometimes, they went unnoticed and could keep their animals on Dabuyang land (Field notes, January 2006).

6.3.3 Management of water resources

Dabuyang has two spring water wells, which are linked with an underground stream. The elders told us that they had never seen the wells dry out even in a severe drought year. The farmers, especially women, collected water everyday from the small well for drinking and family use. Although the well is located at the bottom of a hill not far from the village, it is still a heavy workload for women to bring water to their houses. The sanitation in the village was poor due to the inconvenient location of the water supply. Farmers used small pumps to irrigate their fields in proximity of the larger well. But in drought years, farmers have to buy water from the 'Huangjiazhai' reservoir, which is about two to three kilometres away from Dabuyang. The reservoir was built in the 1950s. The channel network connected to the reservoir reaches the fields of 10 natural villages. The reservoir has also been the drinking water source of three villages and of the township. It is the largest irrigation system in Kaizuo (see Figure 2.5).

The Huangjiazhai Reservoir

The Huangjiazhai system is state-owned and was managed by the township. Now it is managed by the Hydrology Bureau. However, the managers have not been able to keep the system in good condition, because neither the local government nor the bureau has had enough money to pay for repairs and cleaning. The reservoir and channels have not been properly maintained. Farmers could not get a secure water supply. As a result, Dabuyang farmers wanted to explore their own water sources for both tap drinking water and irrigation. The management of the reservoir became worse after 1998. In order to generate revenue for the township, the local government contracted the reservoir to private people to establish a fish farm, without informing the farmers and other people concerned, let alone consulting them. The contract was for ten years. The township would earn 7000RMB each year. In the raining season, the private people are allowed to drain water from the reservoir to keep the water at a certain level. This has been causing floods in the fields of lower situated villages, while in dry periods, the irrigation water they are receiving is not sufficient. This has led to conflicts between the farmers and the fish farm people.

Worse than that: private people were using fertilizers to feed the fish in the reservoir causing serious water pollution. In 2005, about 20 people suffered and got sick during a wedding dinner in Kaizuopu village. It was diagnosed that the cause was toxic waste from the reservoir water. Fortunately, they were cured. Following this incident, farmers' complaints increased. Under pressure, the contract finally was terminated and the management of the reservoir was handed over to the Bureau of Water Management of Changshun County. However, since then, the management is not getting any better. The GAAS team suggested to experiment with a community-based approach to manage the reservoir and channels. But according to government policy, this large water system should be owned and managed by a government unit. The GAAS team started in the summer of 2006 to work with the Hydrology Bureau, Kaizuo township and related villages to organize farmers to be involved in the water system maintenance.

The new pump station

During a planning session in 1995 with the GAAS team, Dabuyang farmers expressed the strong desire to build a tap drinking water system and their own irrigation system to be complementary to the large irrigation system. The CBNRM action planning began with the things the villagers cared most about. Construction and management of water systems was prioritized as number one.

After a series of discussions among farmers, GAAS researchers and township officials, we reached an agreed upon plan. The CBNRM project would provide funds to match the villagers' input. Farmers would carry out the construction work. A coordinating group was elected by the farmers. Detailed regulations were made by the village including a clear working schedule, stipulations for labour requirements, punishments for not turning up for work, and rules to ensure the transparency of financial management. Farmers were organized according to their skills. A farmer

who had originally been a pump station technician was responsible for the design, and the farmers put in their labour. Regarding engineering aspects, the villagers tried to work these out on their own. If unable to do so, they consulted farmer technicians in other communities or asked the township government or the GAAS team to look for technicians. In 15 days a new pump station was built, and connected to a new water system for both drinking and irrigation using pipes.

These facilities have been in use for ten years now, during which time the water source has been properly and sustainably maintained. Even in the severe droughts of 1996 and 1999, water could still be pumped from the well - and the irrigation and piped water systems designed and built by the villagers never had any breakdowns. Households have been freed of about 80 labour days per household per year, of which about 72 are women's labour. This has enabled households to engage more in developing fruit orchards. Women have also become involved in the planting of trees and in attending trainings in fruit tree management. Sanitary conditions have improved. The incidence of diarrhoea has decreased from 66% in 1998 to 24% in 2000). 150 mu paddy fields are irrigated effectively now. Rice yield increased by 3000 kg/ha compared to before the project (Xia, 2000).

FIGURE 6.6 Tap water is metered (Photo: The GAAS team).

Management mechanism

After construction of the water system, management mechanisms were created, formulated and agreed upon by all villagers (see the text below). A basic principle was the use of water and the management services should be paid for by community

members, based on a consensus agreement among all villagers. The farmers took 'ownership' by agreeing to regulate it themselves, and to pay for its management and maintenance - on the basis of the quantity of water used. Later, 'pay for use, pay for maintenance and pay for service' has been applied in natural resource management in Kaizuo and adopted by other places in Changshun. Water management group members were elected among the villagers, consisting of a water manager (he was also the village leader at that time) and a water fee collector. Drinking water taps have been metered, irrigation water has been counted by how much electricity used, so that people pay for the actual water they use. A portion of the fees collected are set aside for the village development fund. The funds generated so far are not modest.

A tap water project in Dabuyang was completed and put to trial use on February 15, 1996. After a month-long trial, and some adjustments, it provides water regularly. In order to keep the facilities functioning smoothly, and for long-term use, we make the following management regulations based on discussions with all villagers.

1 These regulations are linked to 'The Management Regulations of the Electrical Station of Dabuyang village' and become effective on April 1, 1996. Relevant rights, obligations, and principles are defined by these regulations.

2 Responsibilities of the water managers
The facilities are managed by the water managers. Their responsibilities are:
  2.1 Pumping water instantly and keeping water supply regularly.
  2.2 Maintaining, installing and replacing (parts) of the water supply facilities.
  2.3 Cleaning facilities regularly and keeping the water resource clean.
  2.4 If the manager needs other villagers' assistance in tap water use and maintenance, the manager should report to the village head immediately.
  2.5 Recording the water use from house to house every month (reading the water meter), and supplying data to the money collector.
  2.6 Informing the money collector on time about electrical power consumption to supply agricultural water and drinking water.

3 Installation and maintenance
  3.1 New users cannot install pipeline privately. They must ask the water manager to do so and pay for the materials and labour required.
  3.2 Privately connecting another pipeline to the main supply channel

(that is, not connected to the water meter) is forbidden. If someone needs to install or remove a pipeline, he or she must report to the water manager. It is the manager who installs the pipeline and a payment should be made for this service. The user can only make adjustments to the pipeline between the water meter and the tap(s).

3.3 The maintenance fee of the main pipeline (to repair natural damages) is paid through the collecting maintenance fee. Maintenance of the branch pipeline should be covered by the user.

3.4 Repair or replacement of main pipelines damaged by people (not naturally) should be covered by the person causing the damage.

3.5 Users have to buy and replace a water meter instantly in case one is damaged and ask the manager to install it. The user must stop using water if no new meter is in place. Users will be charged five times the amount of last month's fee when using the damaged meter.

3.6 The water manager must repair the main pipeline immediately if damage occurs. The manager's wage will be reduced to some extent if repairs are not done at once (without proper justification) and this causes losses. If the branch pipeline leaks, the user should report it to the manager so that it can be repaired. If the user fails to do so, he or she will be fined five RMB for each infraction. The water manager will be responsible for fining such an infractor.

4 Management of the water resource

4.1 Washing in the water source is forbidden. Privately pumping water with a small machine is also forbidden.

4.2 Drying clothes or other goods on the roof of the pumping house is forbidden.

4.3 Any action that dirties the water resource is forbidden. There will be a 10 yuan for each infraction.

4.4 According to the villagers' Group Arrangements, all the users have the obligation to clean the well once every three years, and to clean the water tank once every year.

5 Fees

5.1 The fee collector is required to collect the fees on time from house to house every month, at a price of 1 RBM per ton. The rate is detailed as follows: 0.1 RMB for the collector; 0.15 RMB for the water manager; 0.10 RMB for special maintenance fee; 0.34 RMB for electrical power consumption according to the manager's data; the rest is used as a developing fund and kept by the charger.

5.2 The user must cooperate and pay the collector. No excuses should be presented for not paying. The user should pay within the ten days fol-

lowing a water meter reading. Delay of payment will be fined one RMB per day of delay. If the delay reaches 1 month, the branch pipeline will be cut off from the main supply.

6 Leaving a tap open and dropping water is forbidden. There is a 5 RMB fine for each infraction.

Agreed to by all the villagers of Dabuyang village on March 28, 1996.

BOX 6.2 Management regulations of water system in Dabuyang village (Source: Dabuyang village, 1996)

Participatory monitoring and evaluation of the new water system

Led by the GAAS team, participatory monitoring and evaluation (PM&E) was conducted in 1999-2001 on water management in Dabuyang (this section is based on Vernooy, et al., 2003: 96-123; see also Vernooy, et al., 2006). The GAAS team did individual interviews with villagers, the village leader, formal village leader, and the water managers, and also conducted group discussions. Basically they shared the common understanding of the situation in the water resource management in Dabuyang village. Most of them highly appreciated the diligent work done by the water resource managers; they praised their good attitude and the delivery of timely and high quality services. They thought that the male manager was indispensable to the water resource management in Dabuyang village because he was a commonly acknowledged indigenous technical expert in the maintenance of facilities and equipment. On the weak side, they noted that he still lacked management experience and skills. And fee collection had been an issue.

Farmers thought that the fee collection issue was attributable to three reasons. First, the village leader was also the principal manager, there was no specific institution to supervise and support his work as manager. Second, the management regulations had not been executed effectively. In particular some 'dysfunctional' behaviour such as water fee payment in arrears had not been banned from the very beginning in accordance to the management regulations. Third, the management group did not post the financial statement regularly and some villagers therefore suspected that the management staff embezzled part of the water fees, which was the main reason why some villagers were reluctant to pay their water fee. Most of these villagers also mentioned that the water fee collector did not collect the water fee regularly (once a month) according to the regulation.

On the water fee collector's part, the water fee collector justified his behaviour by explaining that he could not always stay at home just for collecting water fees, but that he had to go out to do some small business and odds job to earn money especially in the slack seasons. In other words, the remuneration was too small in terms of the time and energy he spent on the water resource management.

				*Problem*	*Measures taken to solve problem*
January	√	√√√√	√√√√√	Difficulty in water fee collection	
February	√	√√√√	√√√√√	Difficulty in water fee collection	
March		√√√√√	√√√	Difficulty in water fee collection	Change management staff (staff)
April		√√√	√√√√√ √√	Difficulty in water fee collection, busy season, staff is not willing to manage irrigation water	Villagers taught each other to operate pumping station
May		√√√√	√√√√√ √	Busy season, staff is not willing to manage irrigation water	Villagers operate pumping station by themselves
June	√√√	√√√√	√√√√√ √	Busy season, staff is not willing to manage irrigation water	Villagers operate pumping station by themselves
July	√√√√	√√√√	√√	Staff has no incentive to collect water fee due to the low return	Staff and villagers suggest employing contract manager for water and electricity
August	√√√√	√√√	√√	Staff has no incentive to manage water and collect water fee due to the low return	Staff and villagers suggest employing contract manager for water and electricity
September	√√√√	√√√√√	√	Staff has no incentive to collect water fee due to the low return	Staff and villagers suggest employing contract manager for water and electricity
October	√√√√	√√√√√		Staff has no incentive to collect water fee due to the low return	Staff villagers suggest employing contract manager for water and electricity
November	√√√√	√√√√√		Staff has no incentive to collect water fee due to the low return	Staff and villagers suggest employing contract manager for water and electricity
December		√√√√√		Staff has no incentive to collect water fee due to the low return	Staff and villagers suggest employing contract manager for water and electricity

TABLE 6.1 Self-monitoring booklet of Dabuyang village, 2000 (ten households). (Source: Vernooy, et al., 2003: 113)

There are rules in the water management regulations to punish those who do not pay the water fee on time, but the enforcement of management regulations has not been so effective. The responsibility of regulation enforcement only depends on one village leader whose nature is not to punish people.
In the discussion on how to solve the existing problems and conflicts, farmers suggested different ways to solve the problems or conflicts, such as the reselection of the water fee collector, the establishment of a sub-group of water resource management sharing the management responsibility, the revision of the management regulations to increase the remuneration of the managers and the setting up of a special group to support and supervise the work of the managers.
According to resource maps made by the villagers, the construction of irrigation facilities (pumping station and irrigation channels) in Dabuyang village provided the reliable irrigation for 10 hectares rain-fed paddy field and made possible the planting of an extra crop (mainly rapeseed). This increased the total income from these fields by at least 50% (Chen, 2000). However, there are some conflicts in irrigation water distribution. The conflicts mainly focus on the issue who should get water first and who should get water last. The manager followed the principle that who came to him first pumped water first. However, when a group of people came to him at almost the same time, the conflict came into being. Later in one village meeting, the villagers agreed that those who pay first get water first and 'no pay no water'. This apparently solved the problem. But for the villagers who had no money at hand when their crops needed water, the manager could hardly refuse their request for water. Water is important for their lives because rice not only provides them food but also cash. At last, the manager gave them water although they did not pay. Some of them paid the fee back when they had money, but some of them did not.
The recordings made in the self-monitoring booklets by ten households in Dabuyang showed that the main problems the villagers were facing were the difficulty in collecting water fee and the ineffective management of irrigation water. The summarized results of the self-monitoring booklets of the ten households are presented in the following table.

Further analysis of findings of monitoring and evaluation
Based on the information from the booklets, GAAS researchers conducted focus group discussions and key informant interview towards the end of 2000. The booklets showed that the village became more and more satisfied with water management. The GAAS researchers interviewed the 10 households who recorded the booklet and asked why they became satisfied with water management. Their explanations were quite similar, saying the former water fee collector had left the village, looking for work in a city. A new water fee collector was elected. He collects the fee every month. In addition after July, the irrigation season had passed; there was no more unhappiness about irrigation water management. The supply of tap drinking water supplied was good, 24 hours a day. However, the problems of the manager's low incentive to collect water fee and difficulty in irrigation water fee were not yet

solved. The villagers were not sure how long the new water fee collector would keep his enthusiasm, especially in the dry season.

At mid December of 2000, the researchers had a meeting with the two village leaders, one of who was also the water manager. The discussion started by inquiring about the constraints they were facing in the water management. The two leaders directly pointed out that the most difficult task was water fee collection, especially the irrigation water fee (including electricity charge). One of the leaders explained that this problem had several reasons: (1) the disincentive to collect fees due to the low return from this job (only 0.03 RMB/ton). (2) most of the villagers in Dabuyang are relatives, so every time they organize a village meeting to discuss the issue of water fee collection, most of the villagers keep silent because they do not want to 'hurt' their brothers, uncles or sons and so on, who owe water fees. This was 'compounded', as the village leader without water management duties added, by the fact that the other leader (with the water management duties) is a very kind and soft man who does not get tough with the villagers who do not pay their water fee. This in turn is making villagers who do pay fees on time very unhappy. The two village leaders agreed that without villagers' understanding and support they could hardly work out a solution for these problems.

GAAS researchers also interviewed three households that still owed the water fee. The woman from the first household said she did not like to owe the fee but she simply had no money at hand. She said she would submit the fee after the harvest of the rape-seed crop. In the second household the man told us: "If the previous collector had come to collect the water fee monthly, I might have had money to pay. But he came every three months or more, so how possibly could I have such a large sum of money to pay?" The GAAS researchers asked him what he planned to do now. He replied that he would look for a job in the city during the off-season and hope he would make some money to pay for the fee owed. The third household said she would pay if the others would pay (Vernooy, et al., 2003: 114-115).

The previous water fee collector was not in the village at the time of the GAAS researchers' visit. The new water fee collector was interviewed. He said: "I collected water fees every month. Normally there was no problem to collect potable water fees, which are only 5-10 RMB for each household a month. Some households had no money at hand, I would pay for them first and they would pay me back when they had money; I could do this because they felt that they owed me personally instead of owing the village. However, for the irrigation water fee, I could not afford to pay for them first. That was too expensive. Usually I pumped water for them after they paid. But in a dry year, like the year of 1999, the villagers needed water so badly for raising and transplanting rice-seedlings. I could hardly refuse to pump water for them when they came to me without paying money. Most of them paid the fee after rice harvesting, but some did not until now. Yes, I broke the rule, but I had no choice. I could not bear seeing my co-villagers hungry because I did not pomp water for them." Later, he suggested to use, "the contract management system." This is a system to contract the management of the water system out to one person or a group

of persons. According to the fee collector this might solve the problem of water fee collection because "the people normally think it is all right to owe money to the state, the county, the township and the village, but not to a private person or a private group." (Vernooy, et al., 2003: 115)
In the follow-up group discussion, most of farmers who participated in the discussion admitted that the contract management system might be a good alternative. But the question was raised if the poor households could still benefit from the water system if the contract management system would be used.
Right now, Dabuyang is using 'the contract management system' for both drinking water and irrigation water management. The water system has been contracted to one villager (the former water fee collector). The contract agreement was approved by the Dabuyang village assembly on December 5, 2001. Most of the regulations so far appear to have been effective under the contract management system. The difference is that the management responsibilities have shifted from a management group selected by the village to a private person in the village, and of course the contracted person is getting some income from the management duties. According to Dabuyang villagers, the contract management works well in terms of water supply, water fee collection and a decrease in conflict, although the cost is a little higher than the group management arrangement. In addition, the village fund is not being replenished by water fees.

The iron factory
A new issue recently emerged regarding water resource in Dabuyang. In 2005, an iron factory was built in Kaizuo. The factory needs a lot of water for cooling. The factory dug a deep well and draws groundwater ever day and night. The groundwater system is connected to Dabuyang's spring wells and a large spring water pond in Guntang village, which is close to Dabuyang. The farmers claimed that the water levels of the wells and water pond had significantly decreased by 2006. The summer that year was very dry. Farmers could not get as much water as before to irrigate their fields. They assumed that it was because the iron factory draws the water. The farmers complained to the township government. But the township officials thought the water levels had decreased because of the severe drought. The farmers could not provide evidence for their argument. So far, this problem has not found a solution.

6.4 Discussion and conclusions

Impacts of the CBNRM action research
The CBNRM action research in Dabuyang results in improvement of natural resource management and farmers' livelihood (also see Chapter 7). A transition of Dabuyang's natural resources from open access to community-managed resources is visible. The transition was achieved by means of developing village-based institutions for collective actions in natural resource management. The emphases of villa-

ge-based institution development were placed on organizing villagers for common control of their natural resources, creating and formulating rules and regulations for access and use of the resources, and building up monitoring and sanction mechanism for effective rule enforcement. The case of Dabuyang shows that local institution building is essential for sustainable natural resource management. It makes it possible for the local farmers to make decisions on the access to and control over the resources, so it promotes the ownership of the farmers to take responsibilities to take good care of the resources. It also provides common spaces for local users to interact with each other. The Dabuyang case also shows that the community-based institutions are embedded in local socio-cultural context and evolve with local economic and political dynamics. Dabuyang, like other villages, is not a homogenous community with 'natural' solidarity. It is important to be aware of these factors when designing and creating an institution that governs common-pool resources.

The five capital assets (natural, social, human, fanatical and physical), which are essential to sustainable livelihood of rural people have significantly increased over the 11 years from 1995 to 2006 (see Section 7.1). The reasons for these improvements given by the farmers are many: more efficient water resource use and management, which has allowed an increase of paddy fields from rain-fed to irrigated by 150mu; access to safe, convenient tap water, which is saving a lot of labour and leading to better sanitation conditions, and to less diseases and better health; the establishment of collective animal grazing, which has saved labour and has kept grassland in much better condition that before. The saved labour has been converted to income generation activities, such as fruit tree planting, mushroom cultivation, seasonal off-farm work, pig raising, etc. Farmers also mentioned that now they have more common space to participate in village affairs, stronger motivation to undertake collective action for the common good of the village, and a better understanding about each other (Field notes, July 2006). Further details of specific impacts of the CBNRM action research are given in Chapter 7.

The social effects have been equally visible. The most important change is that now villagers have the opportunity to participate actively in managing their resources. This has been a vast difference over the traditional top-down approach. Villagers indicated that one important result has been increased community cohesiveness, which helps the communities to identify and solve many problems. New or renewed community-based institutions have been built on villagers' knowledge and skills. More community groups have been organized. Meetings have become an important community event. Whereas before the villagers hardly ever met to discuss the village affairs, today they have learned the value of getting together to discuss their affairs, needs and problems. Conflicts over natural resources have decreased. Farmers' capacity has been enhanced. As a farmer representative of Dabuyang present in the small grant project evaluation meeting in the end of 2000, observed:

"Our women's group continues to collectively take care of the livestock's grazing. This helps us to save labour and to reduce conflicts caused by cattle or buffalo eating crops in the field. We clean our village regularly. Regarding forestland management,

there is no further deforestation and no major conflicts have occurred since we improved our management regulations. In this system, we have clear land boundaries, and clear responsibility, authority, and benefit distribution over the forest. Our drinking water system and irrigation facility function well. However, we encountered some difficulty in water fee collection because we did not implement our regulations of water management properly and lack understanding and support from some households. We finally found way to solve this problem. Our peach trees grow well and we had a good harvest this year. So, our income has increased." (Vernooy, et al., 2003: 126).

Factors that influence collective action in natural resource management

The GAAS team's efforts to organize farmers and build village-based institutions for collective management of natural resources are very much in line with Ostrom's writing on the creation of local institutions for self-governance of common-pool resources. The Dabuyang case meets the design principles or conditions Ostrom proposed for effective institutions, such as clearly defined boundaries, clear group rules to exclude others, operational rules to make collective decisions, feasible monitoring procedures, and risk management to avoid that rights of farmers are challenged by external agents (Ostrom, 1990, 1999). However, it is important to differentiate between conditions that are given, such as resource property rights, village membership, group size, and nature of the resources, and others that are created, including collective agreements, rules for management and sanctions, ability to implement the rules and capacity to cope with external challenges. The creation process of these conditions in Dabuyang has been a long-term and arduous joint effort of learning by doing. In this process, the GAAS team's facilitation is critical in many ways: (1) mobilizing farmers through engaging farmers in identifying problems in natural resource management and developing plans for resource management and village development; (2) organizing farmers to address their common concerns, like safe drinking water; (3) assisting farmers to formulate rules for collective resource management and establish monitoring systems; (4) building farmers' capacity for collective action through training, organizing experience sharing workshops, building local leadership, and 'asking the right questions at the right time' in learning processes; (5) promoting interaction among farmers and between farmers and the local government officials through cross-farm visits, regular meetings, involving township officials in village meetings.

The township government's involvement and support are important. The officials represent legal authority. Their involvement in the CBNRM activities increases communication and understanding between them and farmers. The government's support encourages farmers to take initiatives in self organization and practise their rights in natural resource control. The township government's efforts in mediating disputes between farmers are also vital and irreplaceable for successful CBNRM.

The socio-cultural features of Dabuyang are also favourable for successful CBNRM: long history of the village, strong cultural identity of the villagers, traditional solida-

rity of the ethnic group, and customary laws in natural resource management, such as holy forest management and spring well management.

However, the Dabuyang case also shows that the market forces challenge collective resource management. The market demands for fern sprouts and goats give farmers' opportunity to increase their income, but at the same time the short-term economic benefit they pursue, is threatening the natural resource base, and consequently, their livelihood in a long-term sense. Farmers have come to realize that burning grazing areas (sometimes even forests) for better fern spouts destroys the grassland system and forest, but some farmers continue to violate the rules of no-burning on hills and mountains. Each winter, at least one mountain was set on fire in Kaizuo. In the mountainous areas like Kaizuo, it is not easy to catch the person who sets the fire. There have been no fire incidents in Dabuyang's grasslands and forests since they made the rule, but fire can originate in neighbouring villages and jump over. How to balance farmers' short-term economic needs and long-term livelihoods is a dilemma in developing countries.

Some of the development initiatives have also threatened the local institutions. Driven by the pressure of generating revenue, the county government and township government give priority to economic concerns and compromise environmental concerns, and sometimes, they do compromise farmers' interests in the process. Under this condition, the local governments (both county and township) defend the private forces instead of balancing local communities' and the private business' interests. The iron factory and fish farm in Kaizuo are two of the many examples. Linking local institutions to government policies and obtaining institutional support for CBNRM are therefore important conditions for good performance of local institutions.

Besides external factors, internal factors also need to receive attention, such as village leadership and farmers' capacity to cope with changes and external forces. Since the enactment of the Organic Law on Village Committees in 1987, the village committee members of administrative villages and natural village leaders have been democratically elected by villagers. In this sense, they are the representatives of the villages they are from, representing the interests of the villagers, taking responsibility of organizing villagers for common good of the village. However, in poor areas such as Kaizuo, few farmers are willing to be natural village leader, giving the consideration of 'little resources at hand but big responsibility' for a village leader. Being a village leader is a time-consuming job, needs high commitment and sometimes implies taking risk to contradict or even offend fellow villagers or local government officials. The only reward for being a village leader is 10 RMB (about one Euro) (before 2005, there was no payment at all). It is not surprising to see that in some of the villages, including Dabuyang, the village leader is in fact not elected, but the position is being occupied by a number of villagers, each taking a turn (only men farmers take part in this practice in Kaizuo).

The GAAS team and also the township government put great efforts in facilitating the CBNRM learning process. The question now is to what extent the Dabuyang vil-

lagers maintain or continue this process and how they will cope with internal and external changes without the GAAS team's input? This issue is not only a matter of farmers' capacity, but also of institutional space for their participation in decision making.

7 Evaluating CBNRM outcomes[5]

Qiu Sun, Janice Jiggins, Guowu Ou, Loes Maas, and Yonghua Dai

This chapter aims to provide some 'hard evidence' to determine the impact of the CBNRM action research on achieving sustainable NRM and livelihoods of the local farmers. This will be done by presenting the findings of three comparative studies that aimed to assess: (1) the changes in five capital assets (derived from the sustainable livelihoods framework) over a period of 11 years in contrasting types of villages (2) the strength of NRM institutions between the villages in Kaizuo and in Malu township, (3) the changes in vegetation status over 11 years in two of the earliest CBNRM-involved villages: Dabuyang and Xiaozhai.

7.1 Evaluating CBNRM outcomes using the sustainable livelihoods approach

7.1.1 Introduction

CBNRM is an integrated and holistic approach to address sustainable natural resource management and livelihood improvement of rural people (CIIFAD, 2000; IDRC, 2000; IUCN, 2007). The GAAS team has implemented a CBNRM research project in rural Guizhou for more than 10 year (1995-present). The overall objective of the project is to study and support CBNRM systems in selected villages in Guizhou province in order to realize sustainable rural development goals and to enable local families and communities to achieve improved food security conditions, to enhance their family welfare and income positions, to steadily alleviate poverty in the study area and to have local farmers' lives on the path becoming better off (The GAAS team, 1995a, 1998, 2001b, 2005). The GAAS team's CBNRM initiative in fact shares a common goal with other agents who engage in natural resource management in rural areas, which is "to make an impact that benefits the rural livelihoods and enhances their management of the natural resources in a sustainable way"(Hagmann & Chuma, 2002).

In previous chapters, we have presented the interventions of the CBNRM action research. These interventions included facilitation for farmer organization, local institution building, capacity building of stakeholders, integrating CBNRM principles into government programmes and projects, and so forth. The GAAS team's efforts have led to certain impacts on natural resource management and livelihood improvement (see Chapter 6). However, no systematic evaluation has been done to assess what the CBNRM action research has achieved and to what extent, and in what concrete sense, our efforts have changed people's livelihoods. Assessment stu-

5 We would like to thank Hua Xiang, Tianbo He, Min Chen for their help in data collection. We also want to thank Ronnie Vernooy and Cees Leeuwis for their review and comments.

dies carried out by others mainly focus on the impacts on income generation. The other aspects of livelihoods have been ignored. As Jones (2004:1) put it, "there has been little attention focused on some key issues concerning the links between CBNRM and poverty reduction and sustainable rural livelihoods...most work has focused almost entirely on income generation and has not tried to analyse CBNRM impacts against a broader understanding of poverty that also considers other factors." Turner (2006) also pointed out that the concept of 'development' used in CBNRM is mostly understood as material and economic well-being. In the recent decade, however, there have been important shifts in thinking regarding sustainable livelihoods and natural resource management. These shifts suggest that people's livelihoods should not only be measured in economic terms, such as income or consumption levels, but that the notion of sustainable livelihoods needs to be expanded to include physical, socio-cultural, and political dimensions that are significant to people's livelihood strategy choices (Ford Foundation, 2002; World Bank, 2001). Five types of assets that people need to lift them out of poverty have been identified. They are human assets, natural assets, physical assets, financial assets and social assets. In recent years, CBNRM action research emphasizes rural people's access to these assets through community empowerment, capacity building of local resource users, institutional development, and advocacy for property rights (Ford Foundation, 2002). Chambers and Conway (1991:6) define sustainable livelihood as "a livelihood that comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term".

Based on this definition, DFID developed a conceptual framework of sustainable livelihoods (DFID, 2000). The framework (see Figure 3.1) draws attention to measured changes in the different factors that contribute to livelihoods; five capital assets (natural, social, human, financial, and physical), institutional process and organizational structure, resilience of vulnerability of livelihoods, livelihood strategies and outcomes. DFID's framework has been used by a number of researchers as an analytical tool for addressing, monitoring and evaluating various livelihood resources at the micro and macro level (Haan, et al., 2002; Mancini, et al., 2006).

The sustainable rural livelihood (SRL) framework suggests that livelihoods comprise five basic capital assets that serve different functions in satisfying basic needs (Diana Carney, 1998). They are natural, social, human, physical and financial capital (more discussion in Chapter 3).

This study adopts the SRL framework to assess the changes in capital assets in eight selected villages in Kaizuo township over a period of 11 First we present the general information of the eight villages.

	1 Dabuyang	*2 Xiaozhai*	*3 Chaoshan*	*4 Guntang*
Ethnic group	Buyi	Han	Buyi/Miao	Buyi
Numbers of households	64	26	64	76
Population	280	130	290	285
Arable land area (mu)	834	540	696	751
Forestland area (mu)	1900	900	310	1060
Grassland area (mu)	3700	1100	510	1500
Water sources	2 spring wells & a township managed reservoir	A spring well & a small water pond	A spring well & a township managed reservoir	A water pond & a township managed reservoir
Involved in the project since	1995	1995	1998	1998

	5 Chaobai	*6 Kaizuopu*	*7 Jitian*	*8 Kaizuochang*
Ethnic group	Han	Buyi	Buyi	Han
Numbers of households	181	167	66	90
Population	796	734	292	389
Arable land area (mu)	850	1006	299	305
Forestland area (mu)	660	1010	710	940
Grassland area (mu)	178	890	870	190
Water sources	Two spring wells, & a water stream	Township managed reservoir	Two spring wells & 3 small water ponds	Township reservoir, & a water stream
Involved in the project since	2001	2001	Not involved	Not involved

Note: 1 hectare = 15 mu.

TABLE 7.1 General information of the eight villages in Kaizuo township (Source: Kaizuo township, 2006).

7.1.2 Methodology

Village sampling

Eight villages were purposefully selected from 37 villages in Kaizuo Township, based on two criteria: (1) Different time-span of involvement in the CBNRM project: since 1995, 1998, 2001; and no involvement (as a control group); (2) Success or failure in CBNRM practice:

(i) Four villages were selected based on the results of the village performance assessment carried out in 2000; these four villages had been involved in the CBNRM project since 1995 and 1998 respectively (Vernooy, et al., 2003:128). These four villages are: Dabuyang, Xiaozhai; Chaoshan and Guntang. The evaluation of 2000 was designed and facilitated by Ms Zhang Lanying, the China program coordinator of the International Institute for Rural Reconstruction at that time. This evaluation used a participatory approach, which involved farmers in the evaluation process, including in the definition of what should be evaluated, how to do the evaluation and how to use the evaluation results (Vernooy, et al., 2003). Village one and 3 represented the relatively successful, and 2 and 4 the relatively unsuccessful ones.

(ii) Two villages, Chaobai and Kaizuopu, were selected based on the results of small grant project implementation (Kaizuo township 2004, also see Chapter 8). This evaluation was conducted in a participatory fashion, and was jointly designed and facilitated by the GAAS team and Kaizuo township. The small project implemented in Chaobai was tap drinking water system construction and management, and in Kaizuopu was land terracing for fruit tree planting (also see Chapter 8). The former village was relatively successful, the later was not.

(iii) The two control villages, Jitian and Kaizuochang, were selected from several villages that had never been involved in the CBNRM project. Group discussions with village leaders and farmers were carried out to assess the management practices and the level of satisfaction concerning these practices of their forest, grassland and water system. The most satisfied village and the least satisfied village were selected as the control villages, in terms of 'successful' and 'failure' respectively. The guiding questions for the group assessment were: (1) How large are the areas of forest and grassland in your village? (2) How do you manage your forest, grassland and water resources (including irrigation and drinking water facilities)? And are you satisfied with the management of these resources? Why? (3) Is there any problem or difficulty in the management of these resources? If yes, what are the problems or difficulties? (see Annex B).

Household sampling

25 households were randomly selected from each of the eight villages. A total of 200 households were selected for interviewing.

Identifying indicators for five capitals

The term 'indicator' refers to factors that can be used to best describe each of the five capital assets. The indicators were developed based on a literature review and the experience of working in the project site over a long time. Before the formal household interview, the identified indicators were pre-tested with farmers and readjusted.

Time involved in the CBNRM project	*With successful NRM*	*With Failure of NRM*	*Selection*
1995-2006	Dabuyang	Xiaozhai	The results of annual performance assessment (see Annex A)
1998-2006	Chaoshan	Guntang	
2001-2006	Chaobai	Kaizuopu	The results of small grant project implementation (see Chapter 8)
Never involved (Control)	Jichang	Kaizuochang	The results of group discussion (see Annex B)

TABLE 7.2 Selection of the 8 villages. (Source: This thesis)

	Indicators
Natural capital	• Arable lands (both paddy and upland field) • Forest: timber and non-timber products • Grassland • Water source
Social capital	• Trust, mutual help, network, collective activities
Human capital	• Health, education level and technical skills of family member, labours availability in the family
Financial capital	• Cash, saving, loan or credit, accumulated grain and livestock for selling
Physical capital	• Roads, house, irrigation and drinking water facilities, production tools, fuel energy, communication, market

TABLE 7.3 Indicators for the five livelihood-related capitals. (Source: This thesis)

The researchers

A total of five researchers carried out the interviews: two GAAS team researchers and three non-GAAS team researchers. Among the three non-GAAS team researchers, one was from another project team of GAAS and two were newly graduated university students who were working as volunteers/interns in GAAS (supported by a Non-Profit Organization in China). One of these two volunteers graduated with a major in rural development at China Agriculture University in Beijing and the other one graduated with a major in sociology at Yunnan University. The purpose of involving the non-GAAS team researcher and the volunteers in the interviews was to avoid or limit the possible bias of the GAAS team researchers.

Scoring and rating of the capital assets

The face-to-face interviews were carried out household by household and from village to village during June-August 2006. We went to the villages together, and then went individually to the different households. We first introduced ourselves to the farmers and explained the purpose of the study. Then we explained to them the five capitals and indicators for each capital asset. It was important to make the farmers understand that the survey was about 'the accessibility of the capital assets for them' and not about 'the importance of the capital assets to them'. Methods of scoring were explained in detail to the interviewees.

Farmers were requested to score indicators in relation to their availability by allocating scores between 0-10 (0: not available at all, 10: absolutely available) first for the year 1995 and then for the year 2006 (see Annex C). For example, the question we posed to the farmers for natural capital was: If giving 0 to not any availability and 10 to absolute availability, how much do you give to 'arable land', 'forest', 'grassland' and 'water resources' for year 1995 and 2006 respectively? What are the reasons for the different scores for 1995 and 2006?

The survey enumerators individually contacted the identified interviewees and obtained their responses in face-to-face interviews using a pre-tested questionnaire. Interviewees were also asked to indicate the most important reason for scoring differently for 1995 and 2006. This question helped the researchers to understand what accounted for the changes in variables/indicators.

Data analysis

The data were calculated and analyzed through the SPSS programme. Factor analysis was done to validate the variables/indicators used to make the five capitals operational in interviews. Then the mean values of the capitals for the baseline and the impact year were calculated and compared for the eight villages. Significance of differences has determined using Student's Paired-Samples T-test.

7.1.3 Results

Factor analysis

To validate the relevance of the selected variables for each of the capital concepts and for the sake of summarizing the data, principal component analysis was carried out on each of the five groups of variables, separately for 1995 and 2006. The unrotated factor structures are presented in Table 7.4.

For three of the five groups of variables, this procedure led to a rather strong first factor with relatively high factor loadings for all the constituting variables. This means that the group of selected variables may be considered to represent the concept quite well. This holds for 'natural capital', 'financial capital' and 'physical capital' (Eigenvalues varying between 1.4 and 2.0 in 1995 and between 1.6 and 3.0 in 2006, see Table 7.4). Also for the capital concept 'social capital', the factor solutions for 1995 and 2006 resulted in rather strong first factors, however the variable 'mutual help' loaded relatively low on this factor in 1995 (factor loading .220). It means the variable 'mutual help' did not contribute much to the concept of social capital for the 1995-data. However, for 2006 the concept 'social capital' was represented by all four variables, including 'mutual help' (factor loading .497). The same holds for the concept 'human capital': the factor solution for the 1995-data resulted in a rather strong first factor, however the variable 'health' did not contribute much to the concept of human capital for 1995 (factor loading .230). However, for 2006 the concept 'human capital' was represented by all four variables, including 'health' (factor loading .499). In both cases, we decided to include all four variables in the respective capital concepts, for the 1995-data as well as for the 2006-data.

Based on the factor analysis, we decided that the operationalisations of the five capital concepts can be considered valid, and therefore we decided to construct a summated rating for each of the concepts, which was made up by a respondent's separate scores on the constituting variables divided by the number of variables.

Capital assets	*1995 Factor loadings*			*2006 Factor loadings*	
	Component 1	*Component 2*	*Component 3*	*Component 1*	*Component 2*
Natural capital:					
Arable land	.724	-.386		.810	
Forest	.666	.462		.545	
Grassland	.537	-.602		.616	
Water resource	.442	.670		.681	
Eigenvalue	1.4	1.2		1.8	
% of variance explained	36.3	29.4		44.9	
Social capital:					
Mutual help	.220			.497	
Network	.721			.698	
Trust	.779			.818	
Collective Activity	.788			.824	
Eigenvalue	1.8			2.1	
% of variance explained	44.9			52.1	
Human capital:					
Health	.230	.852		.499	.634
Education	.662	-.161		.707	-.403
Skills	.636	-.510		.628	-.544
Labour force	.681	.345		.538	.576
Eigenvalue	1.4	1.1		1.4	1.2
% of variance explained	34.0	28.3		35.8	29.8
Financial capital:					
Cash	.667			.704	
Loan/credit	.467			.473	
Saving	.767			.738	
Grain/livestock	.442			.619	
Eigenvalue	1.4			1.6	
% of variance explained	36.2			41.2	
Physical capital:					
Road	.497	.519	.374	.675	-.537
House	.510	.666	-.174	.609	-.023
Water facilities	.499	-.527	.428	.725	-.330
Tools	.622	.019	-.143	.567	.551
Energy	.503	-.093	.415	.588	.598
Communication	.440	-.175	-.688	.781	.124
Market	.647	-.343	-.199	.635	-.228
Eigenvalue	2.0	1.1	1.1	3.0	1.1
% of variance explained	28.7	16.4	15.1	43.3	16.1

TABLE 7.4 The factor structures of the capital concepts for the years 1995 and 2006 (all components with Eigenvalue above 1.0 included) (Source: This thesis)

Village	*Year*	*Natural*	*Social*	*Human*	*Financial*	*Physical*
Dabuyang	1995	5.65	6.45	6.35	3.73	4.03
	2006	7.33	7.82	6.99	5.76	7.05
	Difference	1.68	1.37	0.64	2.03	3.02
	T-value	7.60 (a)	6.19 (a)	2.30 (b)	7.07 (a)	10.89 (a)
Xiaozhai	1995	4.31	5.30	5.68	2.72	3.70
	2006	4.46	5.25	5.74	3.43	4.95
	Difference	0.15	-0.05	0.06	0.71	1.25
	T-value	0.73	-0.26	0.56	4.18 (a)	5.45 (a)
Chaoshan	1995	5.31	5.95	5.81	3.67	3.75
	2006	6.46	7.21	6.90	5.74	7.62
	Difference	1.15	1.26	1.09	2.07	3.87
	T-value	4.77 (a)	6.43 (a)	3.67 (a)	7.60 (a)	11.58 (a)
Guntang	1995	6.45	5.57	5.64	3.41	4.53
	2006	6.59	5.82	5.88	4.21	6.57
	Difference	0.14	0.25	0.24	0.80	2.04
	T-value	0.77	0.86	1.34	3.34 (a)	9.25 (a)
Chaobai	1995	5.09	5.14	5.73	2.45	4.02
	2006	4.64	6.02	6.24	3.31	6.05
	Difference	-0.45	0.88	0.51	0.86	2.03
	T-value	-2.23 (b)	4.16 (a)	2.40 (b)	4.23 (a)	8.16 (a)
Kaizuopu	1995	4.90	4.54	5.39	2.58	4.19
	2006	4.96	5.24	6.25	3.69	6.05
	Difference	0.06	0.70	0.86	1.11	1.86
	T-value	0.49	4.92 (a)	3.77 (a)	4.36 (a)	9.03 (a)
Jitian	1995	4.91	5.47	5.33	2.12	3.83
	2006	4.88	6.21	5.54	2.92	5.11
	Difference	-0.03	0.74	0.21	0.80	1.28
	T-value	-0.23	2.76 (b)	1.18	4.74 (a)	8.05 (a)
Kaizuochang	1995	5.48	5.09	5.92	2.47	4.55
	2006	4.66	5.14	6.33	3.72	5.70
	Difference	-0.82	0.05	0.41	1.25	1.15)
	T-value	-3.73 (a)	0.31	2.29 (b)	6.05 (a)	7.93 (a)

Note: T values marked by letters are significant at the following levels: a = p< 0.01, b = p<0.05

TABLE 7.5 Scores on the five capital concepts and differences in scores between the two years, test-statistics and significance levels for the score-differences (Student's paired samples T-test).(minimum possible score is 0 and maximum possible score is 10) (n=25 for each village) (Source: This thesis)

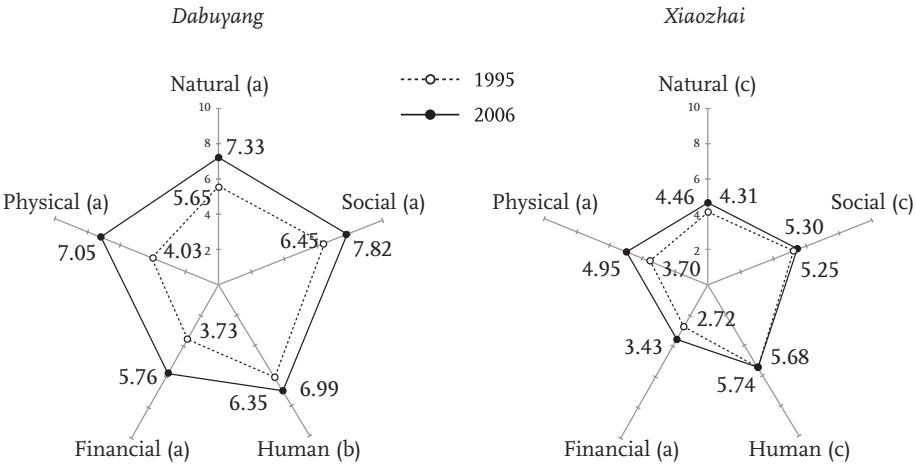
General findings of the T-test

Significance of differences for each of the capital concepts between 1995 and 2006 for eight villages was determined using Student's paired samples T-test. The results are presented in Table 7.5.

7.1.4 Comparison between successful and non-successful villages

Dabuyang vs Xiaozhai

Dabuyang and Xiaozhai have been involved in the CBNRM project since 1995. The project activities included (1) organizing farmers to build tap drinking water system, small scale irrigation system, village road, fruit tree planting, goat rearing, and the animal bank in Dabuyang; (2) building local institutions for collective management of the water systems, village road, forest and grassland, (3) organizing cross-village visits, study tours and training workshops on community building, participatory monitoring and evaluation, and farming technology. The interventions of the CBNRM project in these two villages are almost the same, but the outcomes of the interventions are significantly different. We use the tool of spider diagram to visualize the changes in five capitals over 11 years (prior to, and after 11 years of CBNRM project involvement).



Note: T values marked by letters are significant at the following levels: a = p< 0.01, b = p<0.05, c = no difference

FIGURE 7.1 Changes in five capital assets between 1995 and 2006 for Dabuyang and Xiaozhai villages (Source: This thesis)

Frome the diagram (Figure 7.1), it is obvious to see the large differences between Dabuyang and Xiaozhai villages in the relative changes of natural, social and human

capitals; surprisingly, the diagram indicates a decreased level of social capital in Xiaozhai village. It means that given the seemingly similar CBNRM intervention, Dabuyang performed much better than Xiaozhai. This raises the question of why the same intervention has a different impact on these capitals in the two villages? Or in other words, why do these two villages have different CBNRM performance? And what factors could account for this difference?

Capitals	*Dabuyang*	*Xiaozhai*
Natural	Improvement of forest, water source and arable land in terms of soil fertility. Some mentioned the degradation of grassland	Damage of tap drinking water system caused difficulty to access to water, but improvement of forests and arable land in terms of soil fertility
Social	Increased trust between villagers and collective activities	Decrease in trust and collective activities
Human	Improvement in education and skills	Improvement in education and skills, but shortage of labour force
Financial	Incomes from increased grain yields, fruit tree planting and animal husbandry, better availability of loans (from Animal Bank and the township rural cooperative)	Increased income from off-farm jobs. There are two private mining grounds in the village (one for sand and another for calcium carbide)
Physical	Improvement of house condition, road, communication, irrigation and drinking water and electricity facilities	Improvement of house condition, road, communication, drinking water, electricity facilities and better access to the local market

TABLE 7.6 Reasons from the respondents for changes in five capital assets in Dabuyang and Xiaozhai. (Source: Field data)

From the interviews, the difference in the performance, especially for the natural capital and social capital is mainly reflected by the success and failure of organizing collective action. Collective action here refers to villagers taking responsibility to jointly manage their commonly owned natural resources, such as water systems, village road, village fund, forest and grasslands. Dabuyang has more collective activities than Xiaozhai village. From the interviews and case studies of Dabuyang and Xiaozhai (see Chapters 5 and 6), we summarize the following reasons:

(1) The socio-cultural context such as history, ethnic group and traditions influence the ways people relate to each other and also the way they relate to their resources. Dabuyang is a Buyi village. The villagers, mostly the women, often organize collective activities, such as singing their traditional songs, celebrating festivals, and practising traditional rituals. The villagers clean their spring wells

and maintain their village road once a year. They have well developed traditional mutual help mechanisms, such as Hexinhui (see Chapters 6 and 8) and help each other in the busy farming season, building houses, and taking part in other events (weddings or funerals). The Dabuyang villagers have a strong sense of belonging to their village and belonging to their ethnic group. Xiaozhai is a Han village. The Xiaozhai villagers rarely have collective activities, and the mutual help practices are normally limited to building houses and to attending wedding or funeral ceremonies. Compared with Dabuyang, the Xiaozhai villagers have less sense of belonging together. This argument is supported by the study carried out in 1995 by a group of social scientists (Weng, et al., 1995). Trust and network are built through people's interactions. Mutual help and collective activities promote interactions between people. The CBNRM was practised in the local socio-cultural context, and the interventions for collective actions in natural resource management were built on the community's traditional practices.

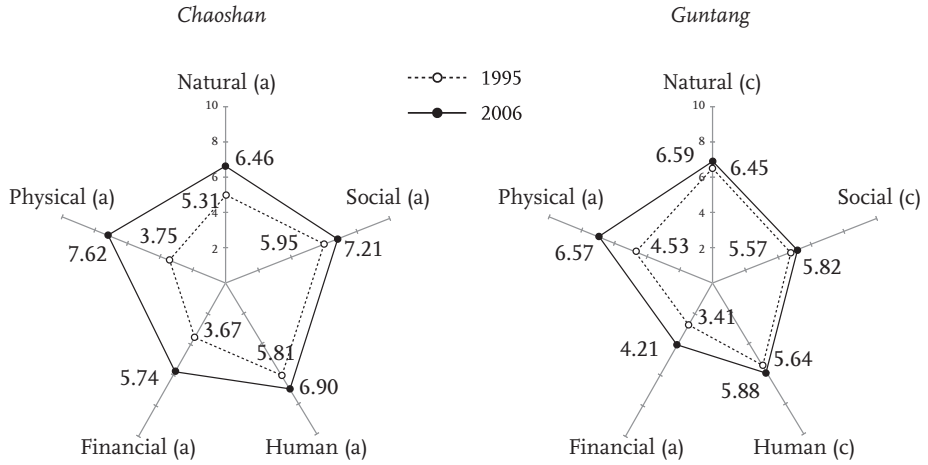
(2) Village structure is a vital factor that affects success in collection actions. The case of the Xiaozhai mill house, which is presented in Chapter 5, shows the unbalanced power relation between the dominant clan and the other villagers in public affairs, and that unfair village leaders discourage villagers to organize collective actions.

(3) External intervention is crucial for success or failure of collective actions. External support in facilitating joint efforts helps the organization of villagers. Of course, poorly executed external facilitation brings damage to a village and to people's livelihood. The mistake made by the GAAS team in the Xiaozhai mill house case is an example (see Chapter 5). Partly because of this, Xiaozhai performs even worse than other villages with few or no CBNRM interventions.

Chaoshan vs Guntang

Chaoshan and Guntang have been involved in the CBNRM project since 1998. The project activities included (1) organizing farmers to build (Chaoshan) or improve (Guntang) tap drinking water system, small scale irrigation system, village road, and fruit tree planting; (2) building local institutions for collective management of forest and the built water systems and village road; (3) organizing cross-village visits, study tours and training workshops on community building, participatory monitoring and evaluation, and farming technology.

Figure 7.2 shows the big differences between Chaoshan and Guntang villages in changes of natural, social and human capital. The two villages are inhabited by ethnic groups. They have similar natural conditions in terms of geographical location (see Figure 2.2), topography (the GAAS team, 1998) and stocks of arable land. Guntang has much larger areas of forestland and grassland than Chaoshan.



Note: T values marked by letters are significant at the following levels: a = p< 0.01, b = p<0.05, c = no difference

FIGURE 7.2 Changes in five capital assets between 1995 and 2006 for Chaoshan and Guntang villages. (Source: This thesis)

Capitals	*Chaoshan*	*Guntang*
Natural	Improvement of forests and arable land in terms of soil fertility	Improvement of arable land and forest, but dramatic decrease in water resource (see chapter 5)
Social	Increases in trust, networking and collective activities	Increase in networking, but decrease in mutual help and village collective activities, little change in trust
Human	Increases in education and skills in fruit tree cultivation, animal disease control and marketing	Little changes in skills, improvement in education
Financial	Increased incomes from fruit tree planting, increased grain yields and better availability of loans	Increased incomes from off-farm work and increased grain yields
Physical	Improvement of house condition, road, communication, irrigation, drinking water and electricity	Improvement of house condition, village road, communication, and electricity; but decrease in irrigation

TABLE 7.7 Reasons from the respondents for changes in five capital assets in Chaoshan and Guntang. (Source: Field data)

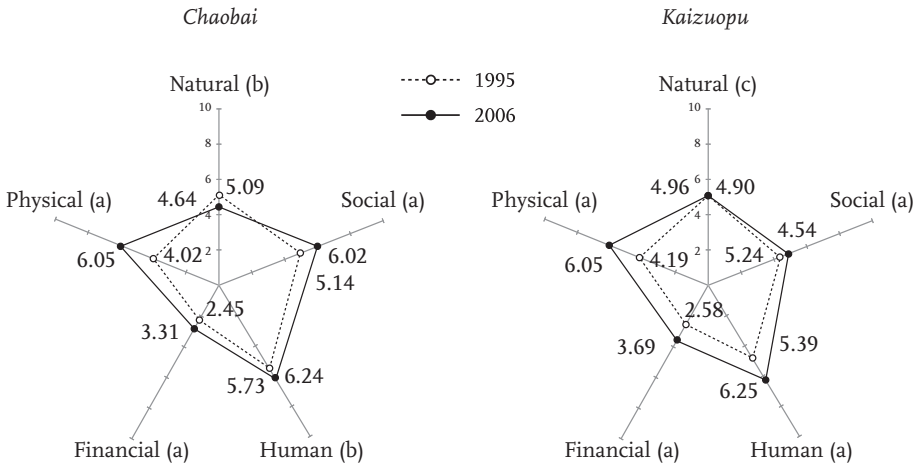
The water volume of the Guntang water pond dramatically decreased in 2006, because of heavy substraction by the iron factory and serious drought. The respondents gave low scores to the water source. The different performances in social capital of the two villages are again reflected in the differences in organization of collective actions. In other words, Chaoshan is more successful in organizing for collective action. The most plausible explanations for the different performance of the two villages are:

(1) Leadership: formal and informal: Chaoshan has an elected village leader, who has been considered by the villagers as fair, responsible and not selfish. He has been the village leader for more than 10 years. In 2001, he wanted to resign because it is a time-consuming task, for which no payment is received. But half a year later, he was re-elected by the villagers, because they were not satisfied with the new villager, a young man who was always out for off-seasonal work. Chaoshan has an influential informal village leader. He is a retired township official, who maintains good relationships with county and township officials. He could get some support and resources for the village, such as cement for road construction. The two leaders can cooperate, and both of them commit to the common good of their village. They organized farming technology learning groups, and supported a village vet to provide services and training for the villagers (Field note, July, 14, 2006). There are no such leaders in Guntang village (Field notes, August 3, 2006). As one Guntang villager told us: "We have elected several village leaders, but no one wanted to be the leader. The farmers were elected were not willing to spend their time to do things for the village." (Field notes, August 3, 2006). We interviewed a formal villager leader, asking him why he did not want to be a village leader. He told us that: "the job of village leader is something that only makes you lose and gain nothing. I tell you only one story, then you will understand why I do not want to be the village leader. Once one piece of our grassland was opened up by another village for road construction, I wanted to get my fellow villagers' support to argue with that village, but only few villagers came with me, the rest of them were just busy with their own things." (Field notes, August 4, 2006).

(2) Chaoshan is one of the good examples of CBNRM practice. Many visitors and government officials were invited to visit Chaoshan village. The villagers have more exposure to outsiders and more opportunities to speak in front of people. Their confidence and capacity have improved, which encourages them to organize study tours outside of the township (Yuan & Sun, 2006).

Chaobai vs Kaizuopu

Chaobai and Kaizuopu have been involved in the CBNRM project since 2001. The project activities involved tap drinking water system construction and management for Chaobai village, and land terracing for fruit tree planting for Kaizuopu village (see Chapter 8).



Note: T values marked by letters are significant at the following levels: a = p< 0.01, b = p<0.05, c = no difference

FIGURE 7.3 Changes in five capital assets between 1995 and 2006 for Chaobai and Kaizuopu villages. (Source: This thesis)

Capitals	*Chaobai*	*Kaizuopu*
Natural	Improvement of arable land in terms of soil fertility, but decrease in grassland area and degradation of grassland and forest	Improvement of arable land and increase in forest area, but decrease in grassland area and water source
Social	Increases in networking and collective activities	Increases in networking, collective activities and trust
Human	Increases in education and skills	Increases in education and skills
Financial	Increased incomes from off-farm work and increased grain yield	Increased incomes from off-farm work and increased grain yield, pig raising, and easer access to loan or credit
Physical	Improvement of house condition, road, communication, and drinking water and electricity	Improvement of house condition, road, communication, tools, electricity

TABLE 7.8 Reasons from the respondents for changes in five capital assets in Chaobai and Kaizuopu. (Source: Field data)

The data reflected in Fiigure 7.3 show that the two villages share similarities in the five capital stocks and growth pattern. The data also show that the 'successful' village Chaobai did not perform better than the 'failed' village Kaizuopu, which is not what one would have expect. It is useful to remember that the selection of these two villages was based on the evaluation results of the small grant projects supported by the CBNRM project. The above findings seem to suggest that a single project evaluation cannot sufficiently reflect the complex dynamics that impact on village performance in livelihood improvement.

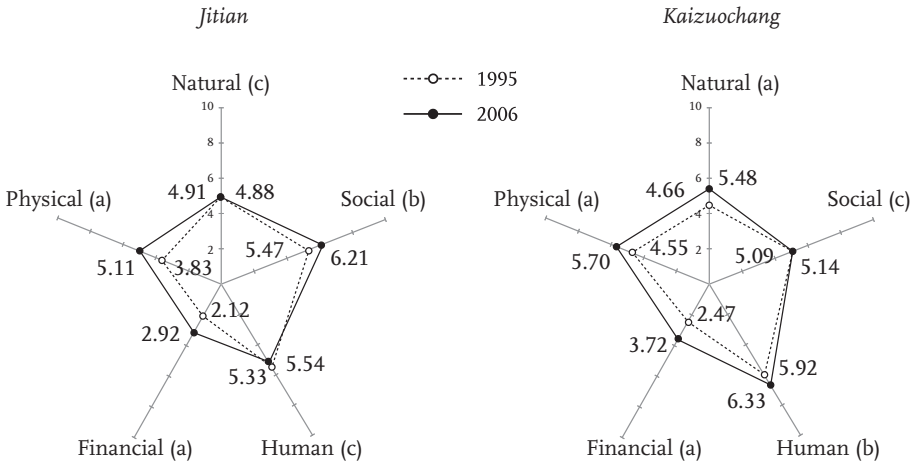
The common thing between the two villages is the failure in natural capital. Chaobai village even has a negative increase in natural capital. Decrease of grassland area is due to afforestation and conversion to arable lands. Degradation of grassland is also visible in these two villages. According to our fieldwork, about 300 mu grassland of Chaobai village was terraced for tree planting in 2006 (Field notes, August 11, 2006), and about 400 mu grassland of Kaizuopu was terraced for tree planting in 2002 (Field notes, January 3, 2006). Holy forests are well protected in both villages, but the rest forests of Chaobai village are more likely open access resource, though they are contracted to the individual farm households in the village. Most of Kaizuopu's forests were reforested in 2002, a result of implementing reforestation programme.

Jitian vs Kaizuochang

Jitian and Kaizuochang are control villages for successful and unsuccessful performance in livelihood improvement respectively. These two villages have never been involved in the CBNRM project.

Both control villages show negative increases in natural capital. For Kaizuochang, the decrease in natural capital is mainly reflected in decrease in grassland area. As one Kaizuochang villager complained, "We do not know where to graze our buffaloes and cattle; most of our grassland has been planted with trees or contracted out for private people to dig clay. So I sold two buffaloes this year and bought a plough tractor with government subsidy. About 20 households or more in our village sold their buffaloes or cattle and bought the plough tractors. I was lucky to receive the subsidy. Not every one in the village got it." (Field notes, August 25, 2006). For Jitian village, the decrease in natural capital is mainly reflected in the decrease in forest, because of a forest fire in 2001, about 50% of the forest was lost (Field notes, June 6 and August 27, 2006).

Jitian did better than Kaizuochang in social capital. Lack of transparency in use and management of the village fund led Kaizuochang villagers to distrust their village leaders, and also to distrust each other. The traditional mutual-help system has become very weak and collective activities have hardly been organized in Kaizuochang village (see Chapter 5). Jitian is a Buyi village. The tradition of mutual help remains strong. In early 2006, the two newly elected village leaders organized villagers to make rules and regulations for management of forest, and water ponds.



Note: T values marked by letters are significant at the following levels: a = p< 0.01, b = p<0.05, c = no difference

FIGURE 7.4 Changes in five capital assets between 1995 and 2006 for Jitian and Kaizuochang villages. (Source: This thesis)

Capitals	*Jitian*	*Kaizuochang*
Natural	Decreases in forest because of fire and water resource because of serious drought in 2006	Decrease in grassland area
Social	Increases in trust, networking and collective activities	Decreases in trust, mutual help and village collective activities
Human	Little changes in skills	Improved skills as construction workers
Financial	Increase in income from off-farm work, grain yield and livestock, easier access to loan	Increased income from off-farm jobs
Physical	Improvement of road, house condition, communication, and electricity, easier access to market	Improvement of house condition, communication, tools and electricity, easier access to market

TABLE 7.9 Reasons from the respondents for changes in five capital assets in Jitian and Kaizuochang. (Source: Field data)

7.1.5 Discussion

The analysis of the data suggests that the CBNRM initiative of the GAAS team has overall had a positive impact on local people's livelihood in the project site. The two successful villages Dabuyang and Chaoshan, which have been involved in the CBNRM since project phase I and II, show significant increases in all five capitals (see Table 7.5).

Compared with the control villages, the two successful villages Dabuyang and Chaoshan have a better performance in all five capitals; while the 'successful' village Chaobai do not necessarily perform better than the control villages in all the capitals (see Table 7.5). This finding indicates that good CBNRM practice needs longer time and more efforts than just a small grant project, like the GAAS team did in Chaobai village. The statistic figures in Table 7.5 also demonstrate that the villages with unsuccessful CBNRM interventions even performed worse than the control villages, especially in social capital. This indicates that poor CBNRM practice can easily have a negative impact on local people's livelihood. Xiaozhai village is one of the examples.

It is necessary to mention that the successful villages show significant improvements in social capital, reflected in increased collective activities and trust among villagers. Our interpretation is that the CBNRM efforts have not only contributed to livelihood improvement in a material and economic sense.

The analysis also reveals that the efforts to improve natural resources, social coherence and human potential need much more input and longer time than the efforts to improve financial status and physical conditions. At the same time, our findings suggest that increases in financial and physical capitals do not necessarily lead to increases in natural, social and human capitals.

The different CBNRM performance of different villages indicates that the CBNRM approach cannot be simply duplicated in varying local contexts. It should be flexible in practice to adapt to the changes in socio-cultural, economic and political variables.

7.2 Strengthening local institutions: a comparison between villages in Kaizuo and in Malu township

In section 7.1, we detailed how the CBNRM action research had an impact on changes in farmers' livelihoods over 11 years of time. This section specifically discusses the effects of the CBNRM action research on local institution building for natural resource management. A comparative study was carried out in July of 2006 in eight villages of Kaizuo and ten villages of Malu township to understand what differences in institutional arrangements exist for the management of forest, water and grassland between the villages with and without CBNRM interventions.

Village	*1*	*2*	*3*	*4*	*5*
Ethnic group	Han	Buyi	Han	Han	Han
Numbers of Households	42	26	41	62	38
Population	172	114	179	275	177
Arable land area (mu)	101	86	86	78	117
Forestland area (mu)	470	140	420	480	310
Grassland area (mu)	420	1200	350	700	1000
Water sources	Two wells for drinking & a water pond for irrigation	A water pond for both drinking & irrigation	A piped drinking water system & a water pond for irrigation	A piped drinking water system & a water pond for irrigation	A well for drinking & a small water reservoir for irrigation
Village	*6*	*7*	*8*	*9*	*10*
Ethnic group	Buyi	Han	Buyi	Han	Han
Numbers of Households	31	256	57	51	35
Population	124	1116	236	258	252
Arable land area (mu)	100	575	73	117	223
Forestland area (mu)	1000	1100	800	350	470
Grassland area (mu)	2000	2200	1750	970	1500
Water sources	A well for drinking & a water pond for irrigation	3 wells for drinking & a reservoir for irrigation	A piped drinking water system & a water pond for irrigation	A well for drinking & a water pond for irrigation	A well for drinking & a water pond for irrigation

Note: 1 hectare = 15 mu

TABLE 7.10 General information of the ten villages in Malu township (Source: Malu township, 2006)

Village	*Forest*	*Grassland*	*Water resources*
V1	• HCRS	No management	• No management for both drinking & irrigation water
V2	• Community management for holy forest • HCRS for the rest	No management	• Community management for drinking water • No management for irrigation water
V3	• Community management for holy forest • HCRS for the rest	No management	• Community management for both drinking & irrigation water
V4	• Community management for holy forest • No management for the rest	No management	• Community management for both drinking & irrigation water
V5	• Community management for holy forest • No management for the rest	No management	• Community management for drinking water • No management for irrigation water
V6	• No management	No management	• No management for either drinking & irrigation
V7	• Community management	No management	• No management for drinking water • Government managed reservoir
V8	• No management	No management	• No management for both drinking & irrigation water
V9	• Community management	No management	• No management for both drinking & irrigation water
V10	• Community management	No management	• No management for drinking water • Community management for irrigation

Notes: (1) HCRS (Household Contract Responsibility System): refers to the community collective owned resources that are contracted to the individual households, and the households can make their own decisions about how they want to use and manage the resources. (2) No management: open access. (3) Community management: refers to the villagers in the community making collective decisions on how the resources should be used and managed

TABLE 7.11 Natural resource management in 10 villages of Malu township. (Source: Field data)

7.2.1 Research methods

Malu is another township of Changshun county, with similar social, culture and economic conditions as neighbouring Kaizuo. The 10 natural villages were randomly selected from a total of 52 natural villages of Malu Township. Group discussion was the key method to generate data on how forest, grassland, and water systems (both irrigation and drinking water system) were managed. Before the field visit, general information about the villages was gathered from the Malu township government (see Table 7. 10), and a list of guiding questions (see Box 4.1) was developed to facilitate the group discussion. The same group of the researchers that did the livelihoods assessment study (see Section 7.1) carried out the work. The researchers were divided into two groups, with three persons in each group.

From Table 7.1 and 7.10, it can be noticed that generally the villages in Kaizuo township are relatively richer in natural resources than the villages in Malu township, in term of per capita arable land, forest and grassland.

7.2.2 The findings

The findings of the fieldwork are summarized in Table 7. 11-13.

We use a table (7.13) to summarize the management institutions for natural resources in the eight villages of Kaizuo and the ten villages of Malu.

	Forest	*Grassland*	*Water resources*
Dabuyang	• Community management for holy forests & the forests far from the village • HCRS for the forests that are close to village (see also Chapter 6)	Community management & collective grazing (see also Chapter 6)	• Community management for both drinking & irrigation water (see also Chapter 6)
Xiaozhai	• Community management for holy forests • HCRS for the rest of the forests	No management	• Community management system collapsed, & drinking water facility broken down (see also Chapter 5)
Chaoshan	• Community management	No management	• Community management for both drinking & irrigation water
Guntang	• Community management for holy forests • HCRS for the rest of the forests	No management	• No management for drinking water anymore due to the pollution • Community management for a big water pond (see also Chapter 5)
Chaobai	• Community management for holy forests • Household contracted management for rest of the forests	No management	• Community management for drinking water system (see also Chapter 8) • No management for irrigation
Kaizuopu	• Community management for holy forests • HCRS for the rest of the forests	No management	• Township government management for both drinking & irrigation water systems (Huangjiazhai reservoir) (see also Chapter 5)
Jitian	• Community management	No management	• Community management for both drinking & irrigation water
Kaizuo-chang	• HCRS	No management	• Community management for drinking water, but difficulty in water fee collection • Government management for irrigation water

TABLE 7.12 Natural resource management in eight villages of Kaizuo Township. (Source: Field data)

	Forest	*Grassland*	*Drinking water*	*Irrigation*
Villages in Kaizuo				
Dabuyang	√ +	√	√	√
Xiaozhai	√ +	–	–	No irrigation
Chaoshan	√	–	√	√
Guntang	√ +	–	–	√
Chaobai	√ +	–	√	–
Kaizuopu	√ +	–	Government managed	Government managed
Jitian	√	–	√	√
Kaizuochan	+	–	√	Government managed
Villages in Malu				
V1	+	–	–	–
V2	√ +	–	√	–
V3	√ +	–	√	√
V4	√ –	–	√	√
V5	√ –	–	√	–
V6	–	–	–	–
V7	√	–	–	Government managed
V8	+	–	–	–
V9	√	–	–	–
V10	√	–	–	√

Notes: (√) With community management institution, which regulates people's behaviour in resource use and management; (-) Without management institution; (+)HCRS.

TABLE 7.13 Summary of management institutions for forest, grassland and water resources in Kaizuo and Malu township. (Source: Field data)

Discussion

Table 7.11-13 show that, generally, the eight villages in Kaizuo have developed more community management institutions for natural resources than the ten villages in Malu. For forests, among the eight villages selected from Kaizuo, only one village does not have a community institution to manage the forest. Among the ten villages selected from Malu, three villages do not have community institutions to manage their forests. And two of these three villages (V6 and V8) do not have any management arrangement. The forests in these two villages are in fact open access resources. V4 and V5 only have management institutions for their holy forests, but the rest of the forests are open access resources. The open access forests do not have valuable trees in the forests. As one farmer remarked in our group discussion: "We hardly even find suitable wood for making a farming tool. We can not gather enough firewood. I can not afford to buy coal or use electricity for cooking and heating the rooms, so my family uses corn straw as fuel." (Field notes, July 4, 2006). These forestlands become the places of grazing animals or wastelands (huangshan). The holy forests in most of the villages in both Kaizuo and Malu are well protected by the villagers. The holy forests have cultural meanings for the local villagers. The rules and regulations for holy forest management are strictly followed by the villagers and punishments for rule violation are severe. The community institutions are very effective to manage and protect the holy forests.

For grassland, only one village (Dabuyang) has a management arrangement, the rest of the village have no management at all. The grazing areas in Guizhou are traditionally open access resources. The open access did not cause grassland degradation in the old days because of the low animal population. Animal husbandry was not an important income source for farmers. Farmers grazed cattle and buffaloes mostly for ploughing purpose and to collect manure. In addition, the grasslands in Guizhou are in the mountains or hills;, given their low economic value, for considerable time they were considered as 'wasteland'. However, the idea of adding economic value to these 'wastelands' as a means to increase farmers' income has brought about several wasteland development initiatives, such as an afforestation or reforestation programme, an animal husbandry development programme, and a land terrace and improvement programme (see Chapter 5). The competing claims over the grasslands by the different development initiatives have changed the traditional way of grassland use. This change has in turn shaped people's relations to the grasslands and the relationships among people. Conflicts arose among different users or stakeholders when they practise their stake-holding for control over the grasslands. The grasslands have dramatically degraded in recent years (see Chapter 5 and 6). This is a new issue for grassland that has not been recognized, let alone addressed in rural Guizhou.

For the drinking water system, two villages from Kaizuo have no management arrangement. Six out of the ten villages from Malu have no management arrangement.

For the irrigation system, among eight villages in Kaizuo, one has no irrigation system, but relies on rain for fields; two villages use government managed irrigation systems, and the remaining five of the villages rely on village-based irrigation systems.

Only one of these five villages does not have community institutions to mange its irrigation system. Among the ten villages in Malu, one relies on a government managed irrigation system; the other nine villages rely on village-based irrigation systems. But only three of the nine villages have community institutions to manage the irrigation water. Lack of community institutions to govern water use and management for irrigation systems often causes conflicts between water users and also lead to damage of the water or irrigation systems (Field notes, July 3-6).

7.3 Changes in vegetation over 11 years in Dabuyang and Xiaozhai

At the beginning of CBNRM project in 1995, the GAAS team invited a group of researchers from Guizhou Botanical Garden to conduct a general survey on vegetation in Dabuynag and Xiaozhai. The survey covered plant species, dominant plants, abundance, density and coverage of plant communities. But crops and weeds in arable lands were not in the scope of the survey. The survey shows that the vegetations in the two villages are secondary vegetation, with very rare primary vegetation. There were 254 plant species, belonging to 98 families and 192 genera. According to the Dominant Species Nomenclature principle, the researchers identified five types of plant communities for Dabuyang and four types for Xiaozhai (Zhang, et al., 1995).
In order to assess whether the CBNRM action research over 11 years before 1995 to 2006 had an effect on the vegetation another survey on vegetation status was conducted in July 2006. For comparison reason, The GAAS team invited the same group of researchers to conduct the survey, and the researchers used the same investigation methods in the same two villages. The study concludes that the changes in vegetation in the two villages generally points towards improvement regarding the average coverage, abundance or density and height of the plants, but some areas of grasslands showed negative changes because of fires and over grazing (Zhang, et al., 2006).
The data were based on strip plots on unfenced land. Because the strips were not exactly the same at the two periods in time, quantitative analysis is not presented here.
We summarise and translate the main findings on the vegetation change from 1995 to 2006 according to the different types of plant communities (Table 7.14 and 7.15).
Table 7.14 indicates that among five plant communities of Dabuyang, four communities show a progressive succession from 1995 to 2006, and only Community II shows a retrogressive succession, because of fires during the same period.
Table 7.15 indicates that among four plant communities of Xiaozhai village, Community II and IV show a progressive succession; most area of Community I has been opened up for animal grazing and tree planting; and Community III shows a regressive succession.

Dabuyang village

Type of plant community	*1995*	*2006*
Community I *Camelia oleifera* *Pinus massoniana* *Pteridium aquilinym*	This community is dominated by Camelia oleifera, Pinus massoniana, and Pteridium aquilinym. The average height of Pinus massoniana was 2-3 metre and the coverage was 10%. The plants at the lower layer were Rhodoendron simisis Planch, Lyonia Ovalifolia Drude Var, Polygonum paleaceum Wall and Grumineae species etc., but they were rare in quantity.	The dominant plants of the community are the same compared with 11 years ago. This indicates the community is stable. The average coverage increases to 65%. Pinus massoniana grow well, with average height reaching 5 metres now. The plants at the lower layer of the community have become denser.
Community II *Quercus fabr* *Castanea seguinii Dode* *Pteridium aquilinym*	The dominant plants of this community are Quercus fabri, Castanea seguinii Dode, and Pteridium aquilinym. The average height is 1 metre with 100% of coverage. The lower layer plants are Smilax china L. and Grumineae plants. This was the place farmers grazed animals.	The original community dominated by several plants has disappeared because of fires, and replaced by a single plant dominated (Pteridium aquilinym) community. The plant coverage has decreased to 50%. This community shows a regressive succession.
Community III *Pteridium aquiliny* *Mysine africana L.* *Millettia pachycarpa Benth* *Caesalpinia sappan L.*	The dominant plants were Pteridium aquiliny, Mysine africana L., Millettia pachycarpa Benth, and Caesalpinia sappan L., but with Pteridium aquiliny as majority. The plant coverage was 50%. The lower layer plants were Grumineae species. This was also the place farmers grazed their animals	The dominant plants have been replaced by Quercus fabri and Populus adenopoda. The average height is 1.0-1.5 and the coverage is 40-50%. Other plants such as Artemisia caruifolia, Daucus carots, and Calastrus orbiculatus appear in this community. The lower layer plants are the same Grumineae plants species. The succession of this community shows a progressive trend.
Community IV *Nyssa sinensis* *Ilex chinensis* *Myrica rubra* *Liquidambar formosana* *Pinus massoniana* *Quercus fabri*	The dominant plants were Nyssa sinensis, Ilex chinensis, Myrica rubra, Liquidambar formosana, Pinus massoniana, and Quercus fabri. The average height was 8 metres and the coverage was 70%. The middle layer plants were Pinus massoniana_Paulownia fortunei (Seem. Hemsl.), Albrizzia julibrissin Durazz, Bromssometia Papyrifera (L.) L'Her. Et Veat, Betula luminifera, Euscaphis japo	This community is very stable. The dominant plants and other species of plants remain. The plant coverage has increased to 80-90%.

Type of plant community	*1995*	*2006*
Community V *Holy forest*	nica (Thunb.) Dippel, and Malus sieboldii (Regel) Rehd etc. The average height was 4 metres, and the coverage was 40%. The lower layer of plants included Ardisia japonica (Thunb.) Blume, Setaria ciridis (L.) Beauv, Cibotium barometz (L.) J. Sm, and Pteridium aquiliny etc.	
	The plant species are diverse, including Pinus massoniana, Cunninghamia lanceolata (Lamb.) Hook, Cupressus funebris Endl., Cinnamimun bodinieri Levl, Catalpa ovata Dn., Catalpa bungei C.A. Mey., Celtis Sinensis Pers, Bromssometia papyrifera (L.)L'Hey. Et Veat and Nyssa Sinensis Oliver etc. The trees were healthy. The average height was 18 metres and the coverage was 75%.	The holy forest has been well protected. Not much change in plant species. The average height is 20 metres and the coverage has increased to 80%.

TABLE 7.14 Vegetation statues of Dabuyang in 1995 and 2006. (Sources: Zhang, et al., 1995; Zhang, et al., 2006)

Xiaozhai village

Type of plant community	*1995*	*2006*
Community I *Castanea seguinii Dode-Quercus fabr - Pteridium aquilinym*	This community was dominated by shrub plants, mostly Castanea seguinii Dode. Farmers harvested the fruits for home assumption. The plant coverage were 70-80%.	About one third of the area has been planted with Pinus massoniana Lamb (pine) and Cunninghamia lanceolata (Lamb.) Hook (fir). Another one third has been opened up as grassland. The remaining third has almost the same with some penetration of Pinus massoniana Lamb
Community II *Populus adenopoda - Betula luminifera- Castanea seguinii Dode -Pteridium aquilinym*	The upper layer of the community was dominated by Populus adenopoda and Betula luminifera. Its average height was 4 metres, with coverage of 65%. The lower layer was dominated by Castanea seguinii Dode. And other plants such as	The upper layer is still dominated by Populus adenopoda and Betula luminifera. Its average height and coverage has increased to 7-10 metres and 80% respectively. More than 10 plant species have been found at the lower layer of the com

Type of plant community	*1995*	*2006*
	Ariseama consanguineum Schott, Vitis quinquaggular is Rehe, and Calium apprine L. Var. fenerum (Gren. Et Godr.) Robb etc. are also found in this community. The average coverage of the lower layer plants was 80%.	munity, such as Rhus chinenisis and Litsea mollifolia etc. The coverage of the lower layer plants are 100%.
Community III *Pinus massoniana-Betula luminifera-Castanea seguinii Dode- Quercus fabri-Pteridium aquilinym*	The dominant plants of this community were Pinus massoniana, Betula luminifera, Castanea seguinii Dode, Quercus fabri and Pteridium aquilinym. The average height of upper layer plants was 1.5-5 metres and the coverage was 20-30%. The coverage of the lower layer plants was 100%.	Because of fires, no wood plants remain. And the original community has been replaced by Pteridium aquilinym, Castanea seguinii Dode, and Quercus fabri. Pteridium aquilinym has becomes the single dominant plant.
Community IV *Holy forest*	The plant species in holy forest were diverse, Cunninghamia lanceolata (Lamb.) Hook, Cryptomeria fortunei Hovibrenk Cupressus funebris Endl. Cryptomeria fortunei Hovibrenk, Cinnamimun bodinieri Levl, Catalpa ovata Dn., Catalpa bungei C.A. Mey., Ginkgo biloba L. and Liguidambar formosana Hance etc. The average height was 16 metres and the coverage was 70%.	The holy forest has been well protected. Not much changes in plant species. The average height has reached 17 metres and the coverage has increased to 80%.

TABLE 7.15 Vegetation statues of Xiaozhai in 1995 and 2006. (Sources: Zhang, et al., 1995; Zhang, et al., 2006)

Discussion

The results of the ecological survey show that the vegetations in both Dabuyang and Xiaozhai villages have generally changed towards progressive succession over the 11 years from 1995 to 2006. However, the vegetations that suffered from fires have shown a regressive succession for both Dabuyang and Xiaozhai village. Those areas are normally the places farmers graze their animals. Farmers burn grasslands or sometime forests for potassium ashes and better and more fern sprouts (see Chapter 5 and 6). Burning grasslands or forests become a serious issue in Kaizuo, and even in Changshun county. This issue is impossible to be addressed by any single village. Even though Dabuyang has made a new rule of forbidding burn their grasslands, the rule can possibly have effects on Dabuyang villagers, but can not pre-

vent the fires that start from the surrounding villages. Therefore, controlling grassland and forest fires requires cooperation of all the villages in Kaizuo. This kind of cross-community collective action in natural resource management needs effective facilitation and coordination. Township government can play active role in this regard.

7.4 Conclusions

From the comparative studies, it can be concluded that the CBNRM action research has promoted local institutional development for collective action in natural resource management, which has plausibly contributed to the sustainable natural resource management and livelihood improvement of local farmers.

8 Scaling up CBNRM: collaborative learning confronts institutional politics

In Dabuyang, the transition to CBNRM involved changing people's ideas about what is at stake, how to exercise their stake-holding, and the incentives and sanctions to support changes in behaviour. The 'scaling up and out' process described below has attempted to make transitions in other areas and at higher levels, with the same means to help people change their idea of what is at stake or to change incentive/sanction structures that shape how they exercise their own 'stake-holding'. Scaling up is about an expansion that has a cumulative impact (Blackburn & Holland, 1998). The community-based Natural Resource Management approach was introduced into China in the early 1990s, but the practice of this approach is still limited to small-scale projects, and is mostly carried out by research institutes or NGOs. Even though these projects have positively impacted sustainable natural resource management and improved the livelihood of farmers, the value of the CBNRM approach has not yet been recognized and accepted by the Chinese government. The experiences of many countries show that without government support and engagement, the expansion of CBNRM to larger areas, which will benefit more people, is impossible. This is especially the case in countries such as China where the government plays a dominant role in decision-making about natural resource management. This chapter describes the experiences of the GAAS research team as it attempted to link local CBNRM initiatives to government policies. The thesis research has shown that effective community-based natural resource management can be achieved but that it requires some self-restraint as the part of higher levels of government. It also demonstrates that if the achievements documented in this thesis are to be replicated throughout China, then the government structures need support to learn how to bring this about. The tension between 'self restraint' on the one hand and 'support' on the other is addressed in this chapter.

8.1 Understanding scaling-up

8.1.1 Perspectives on scaling-up

There is a growing concern among researchers and donors to expand the impacts of local innovations in natural resource management on the environment and lives of poor people. Local innovations often are facilitated and promoted by NGOs or research institutes, with financial supports from international donors. They are also often limited to special projects or programs separated from the normal processes and structures of public administration. These local innovations are like 'scattered successful islands'. These 'islands' may disappear without support from government policy and local government actors. As (Beck & Fajber, 2004) pointed out "...Once the external facilitators disappear, the programs more often than not evaporate.

Hence the importance of feeding field findings into policy and its implementation, and of working with government departments…that have or can have the capacity to continue programs unaided." Additionally, local innovations are often restricted by 'project or program' boundaries, whereas many problems concerning natural resource management can be addressed only beyond the boundaries, for example, at the watershed, coastal zone, and ecosystem levels (Carter & Currie-Alder, 2006). Furthermore, local innovations do not exist in a vacuum. They are embedded in the social-cultural, political and economic context and therefore are influenced by the contextual factors and constructed in interaction with these factors. Scaling up thus has to address these challenges: connecting the 'islands' to the 'mainland' structures; loosening or widening the boundaries of understanding and activity; and exploring the spatial scales or hierarchical relationships and interactions.

The literature on scaling up offers varied perspectives on these challenges and thus proposes different strategies. Generally, scaling up is seen as an expansion that has a cumulative impact (Blackburn & Holland, 1998). A broadly used definition is that scaling up brings "more quality benefits to more people over a wider geographical area more quickly, more equitably and more lastingly" (IIRR, 2000). This definition stresses the importance of sustainability, equity, and time efficiency and highlights a people-centred vision of scaling up (Gündel, et al., 2001). However, this definition only emphasizes the 'end' of scaling up. For other scholars, scaling-up itself is also a learning process, i.e., a 'means' of "promoting local-level innovation, understanding why local innovations work in specific contexts, and reflecting on their relevance in other geographical and social contexts" (Carter & Currie-Alder, 2006). Scaling-up also represents an effort to link local innovations to policy making, and a facilitating process of institutional change in government bureaucracies (Hagmann, et al., 1998; Samaranayake, 1998; Santamaria, 2003; Thompson, 1995), and a way of "building institutional capacity in the community for promoting and sustaining the innovation and adoption process" (Franzel, et al., 2001). For others, scaling-up is "a multi-stakeholder process consisting of five components, including: framing the context, promoting participation, fostering learning, strengthening institutions, and disseminating successful experiences" (Carter & Currie-Alder, 2006). The analysis of the GAAS team's experiences of implementing the scaling-up strategy offered in this chapter allows some tentative conclusions to be drawn in the final section on the relevance of the literature to the Chinese context.

8.1.2 Vertical and horizontal dimensions

The terms 'horizontal' and 'vertical' scaling up are widely used to refer to different dimensions of expansion of the impacts of projects and programs. Vertical scaling up is taken to be expansion to other stakeholder groups situated at a range of hierarchical levels. It is institutional in nature and involves people from grassroots organizations to policy-makers, donors, development institutions and international investors. Horizontal scaling up is taken to mean a geographical spread and expansion to more people and communities within the same stakeholder group or hierarchical

level (IIRR, 2000). However, researchers argue that the processes of horizontal and vertical scaling up have to be linked in order to achieve sustainable impact overall. Lobo, (1996:9) suggests: "Up-scaling individual success stories to a larger scale calls for a perspective of macro-management which at the same time has to be rooted in and be responsive to the micro-level. Unless there is a continuous and enabling co-operation between the key sectors and actors, such a process would be bound to get unstuck, thus seriously jeopardizing sustainability as well as replicability." Kar & Phillips (1998) analyzed the experience of institutionalizing participatory approaches in the design and implementation of slum-improvement projects in India. They conclude "...for scaling-up to be effective, scaling-down may first be necessary concentrating on a handful of cases of sustained community action in which participatory approached play an important part, and using such cases as learning laboratories." (Kar & Phillips 1998: 57)
According to these varying emphases and strategies, scaling-up can be classified in the following typologies

Scaling up strategy	*Description*	*Issues*
Horizontal scaling-up	Scaling out CBNRM from one village to more villages through replications or transplant of activities, interventions and experiences	• Is CBNRM replicable in different local contexts? • What are the effective strategies to replicate CBNRM in different contexts?
Vertical scaling-up	Institutionalizing CBNRM into regular procedures of government, involving new governance, actors, and institutional rearrangement at both local and government levels.	• What are the implications for power relationships? • What strategies can be used to create new inter-organizational arrangements? • Do the new 'rules of the game' need formal legitimacy?

TABLE 8.1 Typology of scaling-up and issues related. (Source: This thesis)

8.2 The scaling-up strategy of the GAAS team

As in other parts of world, 'successful islands' of participatory natural resource management are scattered throughout China. They are mostly supported by international donors. The GAAS team considered their CBNRM research in Kaizuo to be one of these 'islands'. They proposed that scaling up be based on two understandings (The GAAS team 2001a). One was that the local institutions for CBNRM can

not perform well or even sustain themselves without government's recognition of the common property rights of local communities. This point has been argued in the previous chapters. The second understanding was that the benefits of CBNRM can not be extended to more people over a larger area without involving other stakeholder groups, especially the government. Therefore, the strategic aims of CBNRM scaling up research were (1) to expand effective CBNRM practices in Guizhou province and beyond through closely working with Changshun county government and its line ministries, (2) to strengthen local inputs in the policy making process, and (3) to enhance stakeholders' capacities and strengthen partnership between stakeholders in the CBNRM scaling up process (The GAAS team, 2004).

8.2.1 The process of developing the strategy

Toward the end of GAAS-CBNRM research phase II, the GAAS team carried out a participatory evaluation of the project, with facilitation and technical support from Ms Zhang Lanying, a program officer of IIRR at that time. The team evaluated the research overall, including our work at community and government levels, focusing on what made CBNRM work. The team also critically reflected on the experiences and lessons learnt from the field (Zhang, 2001).

Following the evaluation, a planning workshop, designed by Dr. Ronnie Vernooy in collaboration with the GAAS team, for scaling up CBNRM in Guizhou was held on 13-14 February, 2001 (The GAAS team 2001a). The workshop aimed to identify the issues in scaling up CBNRM and develop scaling up strategies with support from different stakeholders, representing four different groups of people: the GAAS researchers, government officials (with a special interest and assignment as well in the area of poverty alleviation and environmental protection), staff of non-government organizations (members of the PRA networks in Sichuan, Yunnan and Guizhou, and researchers from IIRR and the Centre for Biodiversity and Indigenous Knowledge in Yunnan), and senior program officers of IDRC and the Ford Foundation (both donors jointly funded the GAAS-CBNRM Project Phase III).

The design of the workshop process aimed to achieve two things: to capture the expertise, experiences and expectations (interests, ideas) from each of these stakeholder groups, and to explore ways to build a common ground through interactions among them. In order to achieve both aims, the dynamics included a mix of small group (stakeholder-based) work and plenary presentations and discussions. Cumulatively, the workshop exercises aimed to provide a first outline for a scaling up proposal to be championed by the GAAS team with the support and cooperation of others.

In order to reflect more concretely on the road ahead question, a 'roadmap' method was introduced and used during the workshop (e.g., using the answers provided to guide and answer Why-How? questions. The roadmap would outline which inputs will be used (required) to carry out one or more activities that will lead to one or more outputs, outcomes and impacts. Constructing an applied theory of action backwards -from expected impact(s) to required inputs- allows for a step by step design

of a research plan. According to the 'roadmap' method, guiding questions formulated prior to the workshop were used to structure the workshop program and were combined with the workshop exercises to generate answers to the set of six questions: Why? What? For whom? Who? When? and How to scale up? These were expanded as follows:

(1) What has the GAAS-CBNRM team achieved so far? How have these achievements been realized? (CBNRM ACHIEVEMENTS)
(2) What elements of the CBNRM approach in particular have been useful for the GAAS team? (CBNRM ASSETS)
(3) What have been the experiences of others in promoting participatory, community-based approaches? What has worked? What has not worked? Why? (LESSONS LEARNED)
(4) Is there a demand for a CBNRM approach in Guizhou? If so, where, by whom? Why? (CBNRM DEMAND)
(5) Who are the key 'natural resource management' decision-makers? Who are the key people in charge of obtaining and allocating resources? (CBNRM DECISION MAKERS)
(6) For what exactly do we wish to build capacity? What can we scale up? (THE ROAD AHEAD)

8.2.2 Strategy formulated

Inspired by the enthusiasm generated at a planning workshop and the experiences from other researchers (IIRR, 2000), the GAAS team employed a combined two-directional expansion strategy, vertical and horizontal scaling-up (The GAAS team, 2001b). The vertical strategy sought to integrate CBNRM principles into government projects and programs by enhanced cooperation with four government line ministries of Changshun county, that is the Forestry Bureau, Bureau of Water Management, Bureau of Animal Husbandry, and the Agricultural Office. The horizontal strategy sought to expand the CBNRM project area from six communities to the whole township by working with the Kaizuo township government, and by promoting farmer-led extension (Figure 8.1). In practice, the vertical and the horizontal strategy activities were interrelated and influenced each other, as will become clear in following sections of this chapter.

The strategy was based on explicit principles generated from and defined in Phase I and II of the CBNRM action research. Theses were (1) local resource users' participation in decision-making in NRM; (2) community-based management institutional development, including management groups, regulations and rules, enforcement tools, and conflict management; (3) capacity building of stakeholders for sustainable NRM, especially empowerment of the local resource users; (4) gender sensitivity and pro-poor guidelines help steer stakeholders towards, and hold them accountable to the public good.

At the proposal development stage during 2000-01, the GAAS team had several rounds of discussions with the Changshun county government to determine how to cooperate to expand CBNRM practice in the county. The county leaders and the directors of the relevant line ministries (Agricultural Bureau, Forestry Bureau, Bureau of Water Management, Bureau of Animal Husbandry, Bureau of Land Management and the Agricultural Office that was also Poverty Alleviation Office in Changshun county) participated in these discussions. The GAAS team gave an overall orientation about its CBNRM approach. In fact, these officials had been invited to Kaizuo township several times during Phases I and II to be exposed to the practise of CBNRM in the communities. They understood by then that CBNRM required the involvement of local farmers in decision-making and in taking responsibilities in NRM. The officials were quite interested in sharing responsibilities with farmers, but some of them had a conservative reluctance about letting farmers make decisions. As one of the officials said after the meeting: "I doubt farmers can make good decisions! If we let farmers make decisions, so what is our job?" (Field notes, March 2001)

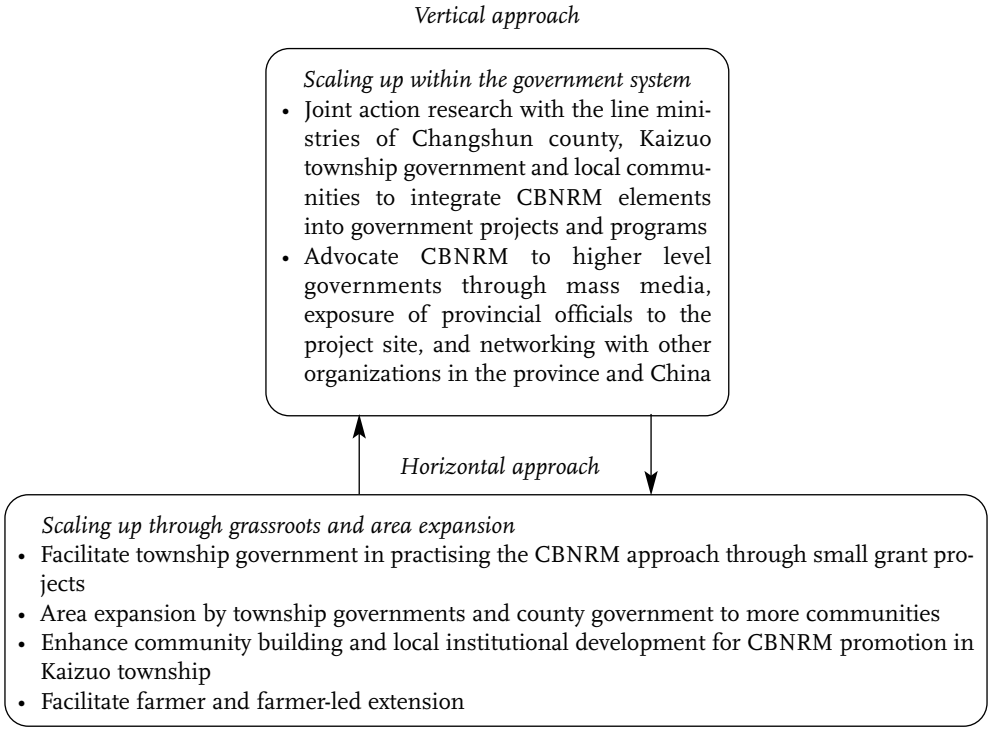
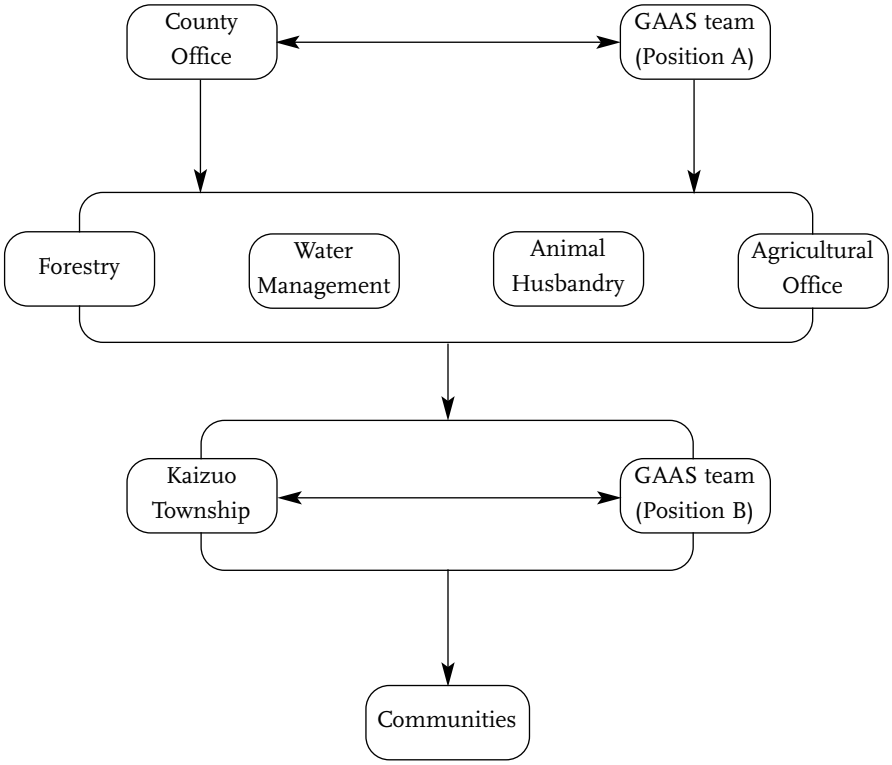


FIGURE 8.1 Horizontal and vertical approaches to scaling. (Source: Adapted from the GAAS team, 2001b, 2004)

The key leader of the county was interested in the GAAS team's efforts. For him it was important that the project would bring project funds to the county. And he also expected that CBNRM would improve the effectiveness of the government's projects in Changshun. The Bureau of Water Management told the GAAS team that they were facing problems of maintaining water facilities due to a shortage of funds and staff. They wanted to experiment with CBNRM for effective management of water facilities. The Forestry Bureau was interested in increasing farmers' interest in planting trees and taking care of the seedlings. They asked the GAAS team to help with this. The Bureau of Animal Husbandry wanted to develop the cattle and buffalo industries in the county. Farmers' learning about technology was their concern. The four line ministries decided to try the CBNRM approach, each from different interests. A leading office was set up for CBNRM scaling up in the county. The key leader of the county was the director of the office; the GAAS team leader and the director of the Agricultural Office were appointed as deputy directors. It was agreed that the function of the office was to coordinate the different line ministries' scaling-up efforts.



Note: the arrows represent communication and interaction

FIGURE 8.2 The structure of the scaling up initiative. (Source: Field data, 2005)

The GAAS team took on different roles in the two dimensions of the strategy. In the vertical scaling-up process, the team acted as trainer, advocate, and coordinator. In the horizontal scaling up process, the team acted more as a mobiliser, mentor, and facilitator. Playing their roles in the two dimensions, the GAAS team also attempted to understand how these two related processes interfaced and supported each other. The results are detailed later in the chapter. First I analyze in more detail the structures of governance within which the GAAS strategy was played out.

The administrative structures of natural resource governance, which are presented in Chapter 5, implied that in order to scale up CBNRM, the GAAS team needed to work not only with different line ministries but also with government at both county level and township level. It was important that the GAAS team play roles in the two positions (A and B in Figure 8.2). In what follows, I first take the two dimensions of horizontal and vertical scaling up separately, and then analyze in more detail the interface and interrelation between the two processes and roles.

8.3 Horizontal scaling-up

This section discusses the GAAS team's efforts to work with the township government in horizontal scaling up through small grant projects. The small grant projects aimed to provide opportunity for the township to take the leading role in expanding CBNRM practice to more communities in Kaizuo. It was hoped that the township officials thereby would come to understand CBNRM better and that their capacity would be enhanced through CBNRM implementation. It was hoped also to achieve a smooth role shift from the GAAS team as lead actor to the township government, and to promote the creation of an effective partnership among the GAAS team, township officials and farmers. In the CBNRM research Phases I and II, the GAAS team had worked directly with local communities, with limited involvement of the township government; the GAAS team was now poised to shift from a role as direct implementer to facilitator.

8.3.1 Small grant project

A small-grant committee was set up in Kaizuo township, consisting of five township officials including three leaders, four administrative village leaders (one from each administrative village) and the GAAS team researchers. At first, the GAAS team suggested having farmer representatives in the committee, but the township government was against this idea. They explained that if the farmer representatives reported what had been discussed in the committee meetings, which would cause difficulties for the township officials to accomplish the tasks assigned by the county government.

The CBNRM principles outlined earlier in this chapter were built into the four operational steps taken to administer the small grant project.

Step 1
The township officials go to the communities to apprize farmers about the small grants, and facilitate farmers in focus group discussions (by gender) and in village meetings (40% of the participants should be woman farmers) to identify the constraints that the farmers want to address in NRM and livelihood improvement. The output of this step is a simple proposal indicating why, how, when to take collective action to address the prioritized constraints. The proposal is to be developed by the farmers with the approval of 80% of the total number of farmers in the village. It is hoped thereby to ensure that the farmers make the decisions about what they want to do, and avoid that the township government decides what they want the farmers to do. Women's concerns are given prior consideration.

Step 2
The small-grant management committee assesses the proposals. The township officials give timely feedback to the farmers whether their proposal is approved or not and explain why. Suggestions are also given for improvement. Mostly the proposals for collective action for NRM (grassland management, forest management) or common goods provision (construction of village road or drinking water facilities) or income generation activities (micro-finance) are approved. Therefore the small grants also serve as a vehicle to mobilize farmers to organize themselves for collective action. It is stressed that transparency in small grant management is required. Everyone involved should know how much the total grant fund is and how much goes for what project. It is important to build trust between government and local communities, and between farmers in the community.

Step 3
The township government helps in formalising the farmer organizations set up to implement the small grant project, mostly based on the existing elected village committee, or they organize farmers to re-elect the village committee if farmers are not satisfied with the existing one. Rules and regulations are discussed and agreed in village meetings for benefit and cost sharing, allocation of tasks among farmers, conflict management, and enforcement tools. Sharing of labour and the fund by farmers is seen as a means to increase farmers' ownership of the project, enhance farmers' participation and the accountability of the village committee and township government to farmers, and to institutionalize the norms of transparency in management. The township government also coordinates the necessary technical support from the relevant county line ministries.

Step 4
The township government initiates and facilitates participatory monitoring and evaluation of the small grant projects, to foster learning and improve the management. Annual evaluation workshops are held with the participation of farmer representatives to reflect on the experiences of the different communities and draw lessons for

improvement.
The GAAS team worked closely with the township government to go through the four steps in the first year of scaling up. Training in the participatory approach was also provided to township officials. The small grants were the venue for coaching the township officials in participatory development processes. Gradually, the township government took a more active role in the horizontal scaling up process. In the three years from 2002-2005, the township government has implemented more than 20 small grant projects covering 29 villages (The GAAS team 2005). The evaluation results showed that most farmers were satisfied with the small grant projects. They notably had developed a positive opinion about the changes in the attitude of the township government officials. As a woman farmer said "they (the township officials) no longer just order us, but in fact they try to listen to us now." (Field notes, December 12, 2005). It was evident that trust between the township and the local communities was being built and that their relationship was improving. The evidence showed also spill over effects - the farmers were reported to become more cooperative in family planning activities and tax collection, which were the most difficult tasks of the township government (The GAAS team, 2005).

8.3.2 Horizontal scaling up in practice: learning collective action through the Animal Bank

I would like present a case study of the Animal Bank to elaborate how the horizontal scaling-up process worked in practice through the small grant project implementation by the township government. The small grant project is part of the CBNRM scaling up strategy. A total of eight villages in Kaizuo implemented micro-finance projects, among which six are to support the rearing of animals through a process called the Animal Bank and the remaining were to support vegetable production and broad income generation activities. The starting times of the project for different villages were spread across 2002-2006. I have selected 4 of the villages that have an Animal Bank, clustered between 2003 and 2004, for the purpose of comparison. Table 8.1 gives the basic information.

Case study of Animal Bank

Animal husbandry has become an important income source for Kaizuo farmers in recent years, because the costs for rice production keep increasing and the market price of rice remains almost the same. The starting fund needed for animal-raising is rather high; many farmers in the project site have limited access to loans. In response to farmers' needs, the township government decided to initiate a micro-loan project (locally called the Animal Bank) in the township. The township, the GAAS team and Dabuyang farmers jointly developed an Animal Bank management guideline. Dabuyang village was the first community to propose the idea of running a micro-loan grant. The development of the management guideline took several months and Dabuyang farmers finally reached agreement among themselves, and also between farmers, township officials, and GAAS researchers in December 2002.

Name of village	*Total number of households*	*Ethnic status*	*Start date of the Animal Bank*	*Amount of grant for the Animal Bank* (RMB)	*Start date of involvement in the CBNRM project*	*Number of households benefited*
Dabuyang	64	Buyi	Feb. 2003	8,000	1995	64
Niuanyun	82	Han	March 2004	9,000	1998	24
Jichang	72	Han	Nov. 2003	16,200	2001	54
Xinzaiyuan	32	Han	Jan. 2004	5,700	2001	19

TABLE 8.2 Information on the four villages and the Animal Bank (Source: Field data)

In the Animal Bank Management Guideline, it was stated that the micro-loan grant - Animal Bank - was to be commonly owned and collectively managed by the farmers in the village. The farmers needed to organize themselves to define the operational regulations that would ensure all people in the village had equal access to the loan, and to regularly monitor and evaluate the management of the loan regarding fairness in benefit and cost sharing, and effectiveness in money rotation, interest collection and enforcement of the regulations. The township government had responsibility to supervise the use and management of the Animal Bank grant, to provide necessary technical support (vet services, for instance), and to assist the village in problem solving. The GAAS team facilitated the process of management guideline development, assisted the township government in using participatory tools when working with farmers, and provided training in CBNRM concepts and practice, and on participatory methods, to both farmers and township government officials. For the GAAS team, the Animal Bank was an experiment of horizontal scaling-up through the township government. It was also a means to promote the organization of farmers and the development of community-based institutions for common-pool resource management. Money management serves as a training ground for skills in the management of other common-pool resources - forest, water and grassland. Thus the farmers' management skills would develop and group trust would be developed gradually. Therefore, the Animal Bank was also a kind of investment to enhance the capacity of the local community and township government, and importantly it was also a platform for more communication and understanding between farmers and government officials.

Dabuyang village

Dabuyang village started to experiment with the Animal Bank in February 2003, after a 6-month preparation. 8000 RBM was granted to the village. During the preparation, the township officials went through the four operational steps of the small-grant project. They tried to listen to farmers and understand farmers. They also faci-

litated village meetings and group discussions. The GAAS researchers went through the whole process together with Dabuyang farmers and the township officials, because this was one of first few small-grant projects implemented by the township government, using a CBNRM approach. The GAAS researchers mentored the government officials in understanding of CBNRM principles in each step of practice. The researchers also facilitated communication between farmers and the government officials to promote trust in each other.

The Animal Bank in Dabuyang is run by women. According the villagers, the men in Dabuyang like to drink alcohol, and this hobby often makes them quarrel for nothing in meetings. After several meetings about the Animal Bank had been spoiled by drunken male farmers, the women decided to organize themselves to run the Animal Bank, a decision that was supported by most of the male farmers (Wei, 2005).

In the project site, there is a mutual-help tradition of money lending, locally called 'Hexinhui'. 'Hexinhui' is an informal small loan system for mutual help. Normally a 'Hexinhui' consists of 5-10 men farmers or married women with a good relationship. Non-married women are not involved in 'Hexinhui', because when they get married, they will leave the village and move to their husbands' villages. Every year each member in the 'Hexinhui' would give a certain amount of money to one member. They would decide the turn of the rotation, but mostly it is decided by drawing lots. So the members know when they can have the money; then they can plan the use of the money in advance, for example, building houses and other big investment activities. Some 'Hexinhui' have the specific purpose of helping each other for meeting the cost of wedding or funeral ceremonies; the members are required not only to give money but also to provide the necessary labour help. In rural Guizhou, weddings and funerals are very costly and labour consuming, and often last several days with all the people in the village involved. For this kind of 'Hexinhui', the rotation is decided by whomever's wedding ceremony comes first. Nobody in the 'Hexinhui' dares to break the rules. Through 'Hexinhui', the farmers become interdependent of each other and build trust and reciprocity between them. These are important elements of social capital that improve the efficiency of society by facilitating coordinated actions (Putnam, 1994).

Dabuyang women decided to borrow the mechanism of 'Hexinhui' to manage their Animal Bank. Dabuyang has 64 households. They divided themselves into 16 subgroups, each having four households. The sub-groups are formed based on willingness. Each sub-group receives a 500 RMB grant. Within the sub-group, each household could borrow 500 RBM for 10 months; then the right to borrow is transferred to another household. The four households in the sub-group decide by themselves the rotation arrangement. Each household pays 30 RBM in interest. The interest is managed by the management committee, but based on the agreement of the villagers. The whole rotation cycle is 40 months.

Before the money was lent out, a Grant Management Committee was formed and five committee members were elected by the villagers. No payment was provided to

the committee members. All the committee members were women. The committee is responsible for financial management (loan allocation and return, interest management), organizing villagers for experience sharing, informing the local government about farmers' needs or difficulties needing help, and reporting the status of Animal Bank management to the villagers. The management committee also has the right to take back the money if it is used for purposes other than productive activities of animal husbandry. And if anybody does not return the money and interests on time, he or she will be fined 5 RBM a day.

According to Dabuyang farmers (The GAAS team, 2006), the Animal Bank has been running very well in their village. The management committee members are responsible and the regulations are well followed. There is no record of not repaying money on time. Villagers are happy with the Animal Bank and its management; no conflict has happened between the villagers. Most of the households used the loan to raise pigs. The number of pigs increased from about 100 to 140. It is certain that to some extent the Animal Bank contributed to the increase in pig numbers. For Dabuyang farmers, raising pigs is not really an income generation source. Compared with the input and output, raising pigs hardly makes money. However, pig raising is a very important agricultural activity in Dabuyang. First, pig raising represents farmers' security. When farmers face cash shortages for their children's education, health care of family members or other emergencies, the first action farmers normally take is to sell their pigs. Another important reason is to get manure for their fields. Thirdly, pork is the major source of meat eaten by the farmers. Normally at the end of the year before the Spring Festival, each household would have one big pig prepared for the festival celebration and for all year round consumption. So most of households in Kaizuo Township normally at least raise two pigs a year. February is the time that farmers buy piglets from the local market. That is also the season to prepare seeds, fertilizers and other farming materials for rice and maize planting. Children start the new school semester in early March. The heaviest expenses for the local farmers thus fall between February and March. The Animal Bank is thus a lot of help for farmers in the buying piglets and feed materials. Both men farmers and women farmers in Dabuyang think they are successful in Animal Bank management. To operate the Animal Bank farmers especially women often gather together to share experiences of animal breeding, disease control and also other things which may or may not be directly related to Animal Bank. The important thing is thus the farmers have more chances to be together to discuss and make decisions about their animals, breed technology, grassland, and other village affairs of common interest. In this regard, the Animal Bank does not only serve as a financial aid mechanism, but also as a common space for farmers to interact. Women's capacity in management and organization is increasing. Several times women farmers in Dabuyang have organized cross farm visits on their own. Sometimes they invited male farmers to join their cross farm visits. Women have more confidence in communication with outsiders, speaking openly about their needs and interests. Villagers' motivation to commit themselves enthusiastically to

the Animal Bank and other community activities has increased substantially (The GAAS team 2006).

Four rounds of loans have been run through the bank in Dabuyang. All the households in the village have benefited. Now the management committee has called for the village meetings to discuss how the money should be used and managed in future. Most Dabuyang farmers show great interest in raising cattle and buffaloes, because of the higher market value than pig. This would require a larger loan fund and would become more difficult to manage. Raising more cattle and buffaloes is also related to their common grassland management. The GAAS team is interested to see how Dabuyang villagers could deal with this more complicated challenge and what necessary assistance we and the township need to provide.

Niuanyun village

Niuanyun Village is the location of the township government experiment station for the raising of sows for piglet breeding. The township government wanted Niuanyun to become a good model of animal husbandry development in Changshun County. The township officials encouraged the farmers to raise as many sows as they could, because only large scale output can draw the attention of and make a good impression on the higher rank of government officials. Gaining the good impression of county leaders is very important for township officials in seeking promotion. Not surprisingly, government officials are very keen on achieving 'large scale' impacts.

In the spring of 2004, the township government initiated the Animal Bank in Niuanyun, aiming to support the farmers to raise sows. It was decided that only those households that raise sows could get a loan from the Animal Bank. These households in the village are relatively better off, because sow raising needs a large investment. This meant the poor were excluded from this small grant project. At first, the GAAS team strongly protested against the idea that only the sow-raising households could get a loan from the Animal Bank. Dispute on this issue between the township government and the GAAS team was negotiated and finally ended with compromise of the GAAS team. However, the GAAS team later realized this compromise was a mistake.

In the first round the loan was given to 24 households, out of a total of 82, to fatten sows. At the end of 2004, Niuanyun had a total of 90 sows. At that time, Niuanyun was taken up as a good example of animal husbandry development in Changshun county; leaders and visitors from the county came to Niuanyun to learn from their experience. The township leaders were praised by the county government. This created a sense that the Animal Bank was the township government's business, not the farmers', according to the farmers interviewed. As a consequence, the farmers had little sense of ownership of the Animal Bank, and little motivation to care for it (The GAAS team 2006). Of course, the households in the village that did not get the loan from the Animal Bank were not happy, and then the tensions rose between the ones who received the loan and those who did not.

The Animal Bank experience in Niuanyun village who was shaped by the township

government rather than the farmers. According to reflection of farmers and township officials in the Animal Bank evaluation workshop (ibid), the township government did not put enough effort in organizing farmers and building management institutions, as they had done in Dabuyang, because they were too eager to achieve a large-scale sow-raising base.

The Animal Bank in Niuanyun has not functioned well. By the end of 2006, the original 24 households still held the loan long past the repayment date in the spring of 2005. The reasons were: (1) from late 2005, the market price of piglets has dropped from 12 RBM/kilo to 5RMB/kilo. When the township urged the 24 households to return the loan, they claimed that they lost money in sow-raising and had no money to return. The farmers had to sell their sows as the piglet price fell. By late 2006 the number of sows in Niuanyun had decreased to less than 20. (2) The process of building a management mechanism was hurried and took place with limited participation of the farmers. The management committee that was established consisted basically of the existing village committee. Niuanyun's Animal Bank was in fact managed by the village leaders. When the village leaders were no longer the village leaders, they no longer felt responsible; the newly elected village leaders did not want to be bothered collecting money for a 'problem' that they had inherited (The GAAS team, 2006).

Jichang village

Based on the experiences and lessons learnt from Dabuyang case and Niuanyun case, Jichang village saw the Animal Bank as a way to complement the Biogas program of the Agricultural Bureau of Changshun County. This program aimed to reduce firewood cutting and improve the sanitation conditions of rural communities by building household-based biogas systems. Such systems can produce bio-energy for cooking, lamps and heating, and as well as high-quality organic fertilizer. The program provided farmers with the necessary construction materials such as cement, a frame for the model of tank, steel, gas stove, lamps etc. On-site technicians were also assigned to guide farmers in building the tank and installing the system. But the biogas system must be matched by feeder systems, such as a new type of toilet and pig pen. So farmers who wanted to have the biogas system had to invest also in the new type of toilet and pig pen. According to the farmers, the cost of building the toilet and pigpen was about 1500RBM. It was estimated that 2-3 pigs are needed to make sufficient gas for a household with 4-5 family members. In most of cases, the farmers had no more money to buy piglets and pig feed after they had invested in the new toilet and pig pen. As a result, many households were not able to use the biogas system immediately. Therefore, Jichang farmers applied for the Animal Bank loan, and the small-grant committee approved their application in 2003.

Jichang village has 72 households (350 people). 16,200 RMB was granted to the Jichang village Animal Bank management committee. The committee comprised two village leaders, two women and three male farmers. The committee members

worked on a voluntary basis. The management regulations were discussed and agreed by most of the villagers. In the first year, 54 households that engaged in the biogas program got a 300 RMB loan each from the Animal Bank to provide them with the necessary seed fund to purchase pigs and pig feed.

The Animal Bank in Jichang village showed both positive and negative impacts (The GAAS team, 2006). According to the farmers, the biogas was sufficient for cooking, heating water, and lamps for most of the year. The farmers rarely cut firewood now. Jichang farmers found they had more time (released from firewood collection) to engage in other activities - fruit tree planting, for example. They used the bio-fertilizer to improve the fruit quality. The sanitation conditions in their families and in the village also had been improved a lot, because the new types of toilet and pig pen were much cleaner than the old ones. In 2005, Jichang village was honoured by being named as 'Ecological Example Village' by the county government. Visitors began to come, and that made the farmers proud of their village. Since then, the farmers have decided to clean their village once a week.

But up till now the original 54 households still keep the loan. They have not followed the regulations they made, which said the loan had to be returned to the management committee after one year, so that the fund could be lent to other households in the village. However, each of the 54 households has just handed over to the committee 15 RMB each year as interest. The accumulated interest has been given as a loan to eight new households. The 8 households were selected by drawing lots from the households who made applications. It has proved much easier for the management committee to collect 15 RMB in interest from each of the recipients than to recover the 300 RMB loan to each household. Of course the 54 households also liked this practice. But the rest of the 20 households in the village were not so happy, but they could do nothing about it, they were the minority in the village, 20 against 54! At least, they had a hope that some day in future they would also get a chance to receive the money. The 20 households also did not join in the biogas project either because most of them did no have enough space in their compounds to build the gas tank, some of them were not in the village when the project was implemented, and few of them lacked money to build the new toilet and pig pen.

Though the management committee consisted of seven people, the two village leaders played the major role. They were the ones who collected interest and loaned the money; the other members did not play any role. The two woman members even did not realize they were the management committee members when we interviewed them (Field notes, 21 September 2005). Their names were just listed in the committee membership; they had nothing to do with the decision making. The two village leaders argued that they just had chosen a safer way to manage the Animal Bank. They could easily collect 15 RMB interest from each of the households every year. One village leader was relatively better off and had been the village leader for years. He was also strong minded and influential. His word was decisive in many village affairs. He had a good relationship with the township government. The township government likes to see this kind of person as the village leaders, because they can

be very helpful in fulfilling government tasks, such as tax collection, solving disputes between farmers, mobilizing farmers to plant trees and cash crops and so forth. These people also get some benefit from helping the township government, such as access to free virus-free seed-potato, and easy access to government loans, for instance. The township officials also keep their eyes closed when such individuals do something improperly. So, when the Jichang leader decided not to follow the agreed management regulations for running the Animal Bank, as discussed and agreed by the villagers, the township officials did not urge the leader to follow the regulations; they just kept quiet; some of them thought that as long as the Animal Bank was running, it did not matter how it was operated.

The GAAS team's concern was that the Animal Bank promoted little interaction among farmers in Jichang village. It did not achieve the objective of being a vehicle to drive learning for collective action, community development and local institutional building. There was little participation by the farmers in Animal Bank management. The loan just served as a subsidy for biogas project, and added value to the village leader's role.

Xinzhaiyuan village

Xinzhaiyuan is a resettlement village, established in 2002. The villagers migrated from three different villages, in response to the policy of converting hilly upland farming land to forestland. There are 32 households (125 people). Xinzhaiyuan has fewer land resources than the other villages described in this section. Agriculture provides them basic food for consumption; for cash income they mainly rely on off-farm jobs, mostly working in mining, or iron or coke factories near the village. When the author talked to the villagers in 2006 (Field notes, 2 July 2006), and found out that the villagers identified with their original villages, they had not learned to regard themselves as members of Xinzhaiyuan village.

The biogas project was an attempt by the township government to help Xinzhaiyuan villagers to settle down. The township officials tried very hard to get the project for Xinzhaiyuan but they had to compete with other townships in the county. This was difficult because first, they need to keep a good relationship with the line ministries and county leaders; second, they must assist the line ministries to implement projects and complete projects in time. Such assistance, for example could take form of mobilizing farmers to contribute labour and money, solving deputes between farmers or between farmers and the line ministries, supervising the progress of projects, or even providing supplementary funds. The township government had to encourage 70% of the households in the village to build the biogas system, otherwise, the Agriculture Bureau said it would withdrew the project from Kaizuo and move it to another township. The biogas project was channelled from the Agriculture Department of Guizhou province. One of the policies of this project was that at least 70% of households in one village must build the biogas systems (Ou, 2005b). The assumption behind this policy was that the project would have impact on forest protection only if most of the households in the village installed biogas systems.

However, soon after the project started in early 2003, the township government found that most of the households in Xinzhaiyuan were too short of money to invest in the new toilets and pig pens, which were required by the project. Under this pressure, the township government initiated the Animal Bank in Xinzhaiyuan to top up the insufficient investment provided though the government's Biogas Program. 5,700 RBM was granted to the village. 19 households received a 300 RMB loan each. 19 households was less than 70% of the total households in Xinzhaiyuan, so the township government encouraged households in a nearby village to build biogas systems. The Agriculture Bureau acquiesced in it. So it is important for township government to keep good relationships with line ministries.

The Animal Bank in this case thus was basically the township government's idea to help Xinzhaiyuan village settle down. The villagers for their part wanted to get subsidies from the government; they were not interested to have the Animal Bank micro-finance project. Not surprisingly, the Animal Bank in fact did not function as a micro-finance mechanism. It operated more as complementary financing for the biogas project. The first 19 households who built biogas systems held on to the loan funds. They had no intention of returning the money because they thought the money was to help them buy piglets for the biogas project. The management committee consisted of only two village leaders and they did not follow the intended management rules (The GAAS team, 2006).

The farmers who did not get the loan fund were not happy with the situation. They complained after the election of the new village leaders and also reported their complaints to the township government. Tensions between the villagers who got and did not get the loan occurred. These tensions further weakened their already weak sense of their community (Field note, 14 June 2006).

Analysis

The success or failure of the Animal Bank is evidenced in the examples presented in this chapter by the variation in institutional performance: the persistence of the management committee, the continuous operation of the agreed rules, and incidence of complaints by farmers. The research questions that arise are: why has the same institutional innovation - the Animal Bank in the four villages - performed so differently? What affected their performance? What are the implications for CBNRM scaling-up?

The Animal Bank in Dabuyang can be considered successful. The management committee is stable and works effectively. It is organizing the sharing of experience, study tours, meetings; giving loans and collecting money back on time. The rules and regulations are strictly followed, no rule violation incident has happened. The farmers are satisfied because they all reasonably benefit from the Animal Bank. The Animal Bank failed in Nieanyun and Xinzhaiyuan, partly succeeded in Jichang. The concerns here are what accounts for the success or failure of the Animal Bank and what can be improved?

Dabuyang has been involved in CBNRM action research since 1995. The farmers

have engaged in collective action for management of forest, grasslands and water resource (for details see Chapter 6). Their rich experiences and improved capacity in CBNRM practice made it relatively easier for them to organize and create new management institutions than for the other villages. Dabuyang is a village comprising one ethnic minority (Buyi). The ethnic villages in Guizhou like Dabuyang have a stronger group identity than the Han villages (J. L. Weng, 1990). Dabuyang women have a close relationship to each other: they graze animals collectively, celebrate their traditional festivals together, and practise religious rituals in a group. The indigenous knowledge of 'Hexinhui' has been adopted in the Animal Bank management of Dabuyang; this meant that the Animal Bank's operation followed a familiar practice and could be followed easily by the farmers. In contrast, Xinzhaiyuan is a newly created village; the farmers came from different places, so they have little sense of belonging to their village. It is notable how the social-cultural context shapes the 'replication' of the Animal Bank. Horizontal scaling-up clearly is not a simple process of replication of innovations in other places; it needs to be sensitive to the context and history of each location. In villages like Xinzhaiyuan, organizing collective action requires more effort to build consensus among farmers, promote the active involvement of different groups of farmers and to strengthen capacity and local institutions.

The township government played a critical role in shaping the scaling-up process and outcomes. On the basis of our interviews it is evident that their attitude changed from 'tell farmers what they should do' to 'listen to farmers about what they want to do'. Trust increased between the local communities and the township government. However, the government has a penchant for large scale projects, because they have also a better chance of promotion if the project is large scale. The GAAS team realized that they need to be more prepared for dealing with this aspect of cooperation and scaling up—i.e., the need to compromise, facilitate and negotiate. In order to do this they have to be clear on the negotiables and the non-negotiables of each partner. This is problematic to determine in the Chinese context, partly because of the lack of formal legitimacy for negotiating on this basis, but also because of uncertainties about the resources each party might be able to commit to the collaboration.

Scaling up of CBNRM ultimately calls for institutionalization and adjustments in the systems and procedures of government. Kaizou leaders may appreciate CBNRM per se, they are never-the-less subject to directives that emanate form higher levels. As with any bureaucracy, systems for performance assessment and reward, whether formal or informal, greatly influence personal behaviour. Influencing the performance assessment system would clearly do a lot in helping to institutionalize CBNRM, but institutionalized support clearly needs advocacy at higher level.

8.4 Vertical scaling up - cooperation with the line ministries

The GAAS team cooperated with four line ministries of Changshun county: the Forestry Bureau, Bureau of Water Management, Bureau of Animal Husbandry and

the Agricultural Office. An illustrative case is presented for each in turn, together with some preliminary reflections. At the end of this section the cases are analyzed as a whole and some tentative lessons are presented and discussed.

8.4.1 Cooperation with the Forestry Bureau

The Reforestation Program has been a long-term strategy of the Chinese Government for environmental protection on the basis of expanding the forest area since the early 1980s. In 1982, the Chinese government commenced The National Tree Planting Day. Each year on March 12 the Chinese Central Television (CCTV) has shown the senior government officials' planting trees, to indicate the importance the government gives to reforestation. This is reflected on the ground in the annual tree planting tasks of the County Forestry Bureaus. However, the Forestry Bureaus have difficulty in accomplishing the task because of farmers' low interest in the reforestation program. In recent years, subsidies have been employed to increase the incentive for farmers to plant trees - 10 RMB for planting one mu in 2002 (Ou, 2005a). But no subsidies are provided for taking care of the trees, which results in the phenomenon of 'planting trees every year but without growing forests'. The survival rates are low, and the seedlings are damaged by human activities and grazing animals.

When the GAAS team approached the Forestry Bureau of Changshun county in 2001, they showed an interest to experiment with the CBNRM approach in the reforestation program. The experiment was carried out in Kaizuo township through the Forestry Station. The Forestry Stations are under of the Forestry Bureau of the county, and are based in each township of the county. The general mandate of the Forestry Station is the implementation of reforestation program, forest fire control, illegal logging control and approval of tree cutting for farmers' self-consumptions according to the forest harvest quota policy.

The Kaizuo Forestry Station has 9 foresters with one director. The director is an open-minded lady with a university educational background. Pressured by the reforestation tasks, she is open to try new ways to get things done. The foresters of the Forest Station based in Kaizuo, the township officials and the GAAS researchers joined the experiment. The township government has an obligation to assist the county line ministries in programs and project activities; for instance, to organize farmers and manage conflicts. And on the other hand the township government also needs to keep a good relationship with the line ministries in order to compete successfully with other townships for projects, especially the projects that allocate funds to the township government, which are normally used to cover any shortage for paying of operational expenses.

CBNRM places the local users at the heart of decision-making about the usage and management of the resources on which their livelihood and subsistence heavily rely. It requires the active participation of local users in collective action in natural resource management. The aim is to create a sense of ownership and motivation among the users so that they have a incentive to protect the environment and manage the resource in a sustainable manner.

From the previous experience of working with farmers, the GAAS team considered farmers' low interest in the reforestation program had three major reasons: (i) unclear ownership and use rights over the trees; (ii) no agreed land use plans between farmers in community and between communities and the Forestry Station; and (iii) little communication between farmers and the foresters due to the foresters' reliance on instruction and a passive position of farmers in the reforestation program, which gave farmers' little sense of ownership in the program. Based on these considerations, a step-by step working plan was developed at the end of 2001with the inputs of the GAAS team, the Forestry Station and the township government officials.

Step 1
Changing their working style to a more participatory style: the foresters and the township officials go to the communities to discuss the reforestation program with farmers, understand farmers' concerns, respect farmers' knowledge and build rapport with the farmers.

Step 2
Joint land use planning with farmers to decide on where to plant timber trees and how to plant them; where to plant fruit trees; where to graze animals; where to contract individual households for firewood and where tree resources are to be collectively managed by the community. In the plan, farmers' interests should be taken into account.

Step 3
Developing community-based forest management institutions: clarifying rights of access to and control over the forests; creating rules to control damage of seedlings, illegal cutting and forest fires; and deciding on the responsibilities of the local communities, the Forestry Station and the township government in tree planting and forest management.

The station foresters took the suggestions of the GAAS team and seriously followed the working plan. The GAAS team closely observed the process and gave timely feedback to the foresters. For instance, the foresters had a dispute with the farmers about dealing with the remaining natural vegetation plants (mostly shrubs) on the planned reforestation lands. The farmers did not want to clear all the plants for the artificial tree planting. They wanted to keep some of the plants for herb tea, herb medicine (Camilla fruit oil for treating burns and scalds for example), agricultural tools (special wood for the shafts of hoe and hook) and beauty (bonsai plants). The foresters wanted to have a dense plantation of trees of a uniform variety to increase the economic value of the forests. Their traditional practice of reforestation was to burn the lands to clear all the natural vegetation before planting the new trees. This practice gave evidence that the environmental concern (biodiversity and soil erosion

control in this case), and farmers' livelihood concerns were subordinated to the economic benefits, even though the reforestation program was launched under the name of environmental protection. Other important reason the foresters gave to justify their practice were that the uniform tree plantation is easier to manage and beautiful looking. Making their work look beautiful is important for government officials because it attracts the attention of higher-rank officials and gains the recognition that is crucial for their promotion. Big scale and beautiful things easily catch attention. That is why there are many so called 'achievement works' (zhengjigongcheng) or 'symbolic works' (xingxianggogncheng), in China.

In this dispute the GAAS team supported the farmers' idea but realized that resolution would need to be found in a careful process of shared learning. The GAAS team convened meetings with the participation of farmer representatives, the foresters, the township officials and the GAAS researchers to share their experiences and rationales. Finally the director of the Forestry Station agreed to try this new method of reforestation: not clear the natural vegetation, just plant the timber trees (mostly pine and fir in Guizhou) between the natural plants along the contour, with about 30% less density than usual. The director proposed this idea to the county Forestry Bureau. This idea was approved on the condition that this method was used discretely in far places that could not be seen from the roads.

The outcomes of this experiment surprised the Forestry Station foresters, township government officials and also the leaders of the Forestry Bureau of Changshun county. A total of 258 households in 14 communities became involved in the reforestation program and 4600-mu lands were forested, exceeding by 600 mu the task designated for that year. This was the first time that Kaizuo to exceed its their allocated task. According to an examination carried out by the Provincial Forestry Department in mid-year, the survival rate of the seedlings was 90%, which was the highest recorded in the county and 15% higher that the provincial average (The Forestry Bureau, 2002; Ou, 2005a). The 14 communities involved in the program now have management regulations in which the use rights and responsibilities of farmer users are defined. The management regulations were developed by the joint efforts of farmers, forestry officials and township officials, implying that the regulations have official legitimacy and are supported by the government. This has given farmers a strong sense of ownership over and responsibility for the trees. Inspired by this experience, the farmers subsequently organized themselves to protect the trees from fire, stealing, animal damage and even government development interventions. For instance, Dabuyang villagers stopped the township government's attempt to cut some of their trees in the forest to place a new electricity wire. In another village in Kaizuo the farmers blocked the bulldozer employed by the county's Land Management Bureau from terracing their forestland. In these and other instances, the Kaizuo Forest Station was honoured by the Forestry Department of Guizhou province. The director of the station and foresters were invited by the Forestry Bureau of Changshun county to share their experiences with the other townships. The foresters from other places in Changshun came to visit Kaizuo. The

experiences shared by the foresters, township officials and the farmers are summarized as follows (Kaizuo township, 2002 and pers.com. the directors of the Forestry Station, 27 November 2002).

We have changed our attitude from instructing farmers to working with farmers, which makes a big difference in the reforestation results. We have learnt that we would get more support from farmers if we have more understanding of their interests and concerns. And we will use this approach in our other works.
Land use plans help us better understand farmers' interests in the multiple uses of lands and forest resources. It is also serves as an entry point to engage farmers in discussions. A good land use plan can benefit both farmers and the reforestation program.
A village meeting is an effective common space for farmers to reach agreement, promote their consensus and responsibility. In each village we have had at least 2-3 village meetings to discuss with farmers about the land use plan and post management regulations until mutual agreement was reached. Then the following work of tree planting and tree protection became much easier. The farmers can do it by organizing themselves without any further push from the government.
Clarifying the rights and responsibilities of farmers in forest use and management is essential but it is not an easy job; it needs much discussion to reach agreement among all farmer households in a village; then this needs to be formally written on paper, so as to reduce any future conflicts over forestland use.

Analysis
The changes in government officials' working style and attitude towards farmers gained the farmers trust and achieved a good result for the project. As an old farmer said "if they (the Forestry Station and the local government) respect us, listen to our ideas then we support them. We understand that the reforestation program is to protect the environment which may also be good for us somehow, but we would be not happy to plant trees in the places we graze our animals." (Field note, 18 June 2002) However, the changes in working style and attitude were based not only on the task pressure but also on the personal interest on the part of the director of the Forestry Station. This was one special opportunity and cannot be anticipated everywhere.
The case demonstrates the importance of government's recognition of and support to local institutions (management regulations and farmers' self-organizations). So the government has to give some thought not to weaken these institutions when it intervenes. When it takes a pro-active role to protect or strengthen the local institutions from damage or interference from other external forces, it may help the local institutions in developing further and resolve internal conflicts between farmers.

8.4.2 Cooperation with the Bureau of Water Management

The piped water construction project in Chaobai village illustrates on other aspect of the challenge of integrating CBNRM principles into the government system (Sun,

2004). The GAAS team made efforts to bring diverse stakeholders to practise CBNRM in this water facility-building project. The stakeholders were: different groups of farmers, township officials, the leaders and technician of the county's Bureau of Water Management, and GAAS researchers. In this case, the farmers were the intended beneficiaries, the construction labourers, and also the water system managers. The township officials were the coordinators (coordinating among farmers and between farmers and officials of the Bureau of Water Management), and co-manager of the project fund. The Bureau of Water Management was in charge of facility design and technical guidance. The GAAS team facilitated the cooperation between the stakeholders, and helped the township with coordination. One of the mandates of the Bureau of Water Management is to provide technical services and guidance to government-funded projects. The bureau assigns one technician to each township in the county.

Struggling for the tap water project

Chaobai village had suffered from a very poor water supply because of the pollution of the stream and the drying out of wells during the summer season. Having safe drinking water had been the villagers' dream for decades. Following the discovery of a new water source in one of mountains near the village, Chaobai farmers together with the township government had applied to the relevant line ministries of county and province for a project to build a tap drinking water system. In early 2002, the provincial sanitation office finally approved the application. However, when the project fund was channelled from the Provincial Sanitation Office to the County Sanitation Office, the county officials used the project fund for another purpose. When Kaizuo township and Chaobai village discovered that the funds had been misused, the township officials and the administrative village leader and Chaobai villager representatives visited the county several times trying to get back the project fund, but the County Sanitation Office denied ever receiving the fund from the province. This created unhappy feeling between Chaobai farmers and the County Sanitation Office. At that time, the township government did not want to make any further effort to get the project fund back because they did not like to break their personal relationship with the officials of the Sanitation Office for a project in which they had no personal stake. It is an 'under-the-table rule' in officialdom that you never offend higher-level officials or your peers over business that is not your affair. But the farmers did not give up. Led by the village leaders, the farmers visited the County Sanitation Office again and again. They also visited the county key leaders and announced they would go to the province government if they could not get the project soon. As a result of their persistent effort, Chaobai village finally got back the project from the Sanitation Office. But the Sanitation Office only agreed to give back 60,000 RMB of the project fund, out of the 80,000 RMB that had been budgeted for the project. The 20,000 RBM was intercepted as so-called project overhead by the County Sanitation Office. Ever since this incident has caused tensions between the farmers and the officials. The farmers hardly trust the officials, and the officials

consider the farmers of Chaobai village difficult people to deal with.
The project was assigned to the Bureau of Water Management of Changshun county. According to the design supplied by the bureau, the total fund needed was about 90,000RBM. So 60,000RBM was absolutely not sufficient. In July 2002, Chaobai village submitted a proposal to the small grant project committee of the CBNRM project. In their proposal the farmers indicated that they would contribute 14,000RBM, and agreed to provide labour. The CBNRM small grant project approved an additional 14,000RBM. The total sum total of 88,000RBMwas credited to the official account of Kaizuo township. It was accepted by farmers and township officials that fund management would follow the fund management rules of the CBNRM small grant project, to make sure the fund was used transparently and properly.
An agreement was made between the Bureau of Water Management, Kaizuo township, villagers and the GAAS team that specified the financial contributions from the county, farmers, and from the small grant of the CBNRM project. The farmers committed to providing labour and some additional counterpart funding. All parties agreed that the project would follow the CBNRM principles. Villagers decided that they preferred to take responsibility for building the system based on their studies of systems in the nearby villages, which showed that those built and operated by farmers worked much better than those controlled by the local government. They discussed at length among themselves how to build and manage the new system.

Whose project?
Despite this agreement, the project implementation process was characterized by a series of struggles over control of the construction and operation of the water system; a struggle over whose project this was after all. The process entered a crisis when the Bureau of Water Management and one key leader of the township decided to contract out the building of the facility to a construction company - as they usually do in these kinds of projects - without the knowledge of the farmers and GAAS team. A rumour circulated in the township saying that someone would make money by contracting the project to the construction company. However, Chaobai villagers did not like the idea of contracting out the project to the construction company. They considered that the quality and post management of the facility would be unsatisfactory. They decided that instead of contracting out the project they would build it themselves with technical support from the Bureau of Water Management. This proposition was communicated by four village representatives to the party secretary on August 7, 2002. GAAS researchers were also informed of this decision by the farmers (Field notes, July 7, 2002).
A meeting was called in the township meeting room. Four farmers (including the two village leaders), four GAAS researchers, four township officials attended the meeting. GAAS researchers facilitated the meeting. The key leader of the township insisted that the project should be contracted out. He reasoned that the Chaobai villagers were hardly organized to build the water facility. He felt that they were not cohesive as they were always fighting each other. He stressed that the farmers were

out to create problems since they had no known skill relevant to the job at hand. He suggested: "If they could make it, I would cook an egg on my hand." The four farmers were annoyed by his words (Field notes, July 7, 2002). Compared to other villages, Chaobai village has more people who do seasonal work in the cities, so they have more exposure to the outside world. They do not always follow officials' instructions without thinking whether the instruction is reasonable for them or not. For this reason, the officials consider these farmers to be difficult to deal with.

The GAAS researchers mentioned in the meeting that imposing idea on farmers was against an important CBNRM principle. The researchers also emphasized clearly that one of the important aims of the small grant project was to enhance the capacity of farmers and officials to practice CBNRM, not to support a construction company to make money. Another key leader of the township had been involved in the CBNRM project for 5 years, and she was clear about CBNRM principles. She explained them to the other township leaders. But the argument continued. So the GAAS researchers suggested convening a meeting in Chaobai village to let farmers make the final decision on how they wanted the water facility to be built. The farmers and the township officials accepted this suggestion.

Before the village meeting, the GAAS team leader called the director of the Bureau of Water Management in Changshun county, informing him what was going on in Kaizuo, and invited him and the vice director to attend the village meeting. The director responded that they were very busy at that time with preparing for a project inspection from the prefecture. They were sorry they could not come, but they would respect the farmers' decision. The director also mentioned that he did not know anything about the contract. If Chaobai village wanted to build the water system by themselves, he would agree to abolish any contractual agreement. He also promised that the technical support from bureau would not change because of this.

In the afternoon, the farmers who were at home were invited to attend the meeting; a total of 85 people attended out of whom 20 were women. The meeting was held in the Chaobai village school campus. Four GAAS researchers, one vice party secretary from Kaizuo township and the Chaobai administrative village leader attended the meeting. The vice party secretary facilitated the meeting. It is a rare occasion that the township officials go to a village to consult farmers' opinion and let farmers make decision. It is what the effort GAAS team had been working towards - a chance to build a platform for all the involved actors to communicate, negotiate, reach agreement and act together.

The vice party secretary explained the purpose of the meeting. He mentioned that they were there to learn about the farmers' ideas and decisions. Then Chaobai administrative village leader explained the sources of funds, the total amount and where the fund was held. After that, one of the GAAS researchers explained the principles of the CBNRM small grant project. The farmers then discussed among themselves. After one hour of heated discussion, they came out with three options: (1) build the water facility by themselves. They would organize themselves to contribute all the labour needed, decide how the piped water would be distributed to each household,

and decide how to manage the system after construction; (2) contract everything to a construction company; (3) organize the farmers to do the easy work and contract the difficult elements to the construction company. They also discussed the advantages and disadvantages of each option. It was good to see the farmers were very open in giving their opinions. The argument gradually tended toward option 1 and 3. The GAAS researchers then suggested that a vote be taken on the options. The result was 49 for option 1, none for option 2, and 16 for option 3, 20 people did not vote (Field note, 7 July 2002).

Afterwards, the GAAS researchers talked to the people who did not vote, trying to find out more about their ideas. Most of them were the relatives of the administrative village leader. The leader once told them that if they agreed to contract the water system construction to the company, the company would build a cement road in the village. But they were not so sure about this. And another reason they did not vote was they did not want to offend the leader. They also showed a concern about how they could trust the people in the village who would manage the project fund. When GAAS researcher asked whether they trusted the people in the township and the Bureau of Water Management to manage the fund instead, their answer was no.

Village Construction Committee and the rules

Immediately after the meeting, a construction committee was formed, seven farmers were elected as the committee members, including the two natural village leaders. The committee members agreed to work on a voluntary basis; each of them took a specific role like accountant, cashier, coordination, organization, material safekeeping and construction advice for the two water tanks and pump house. The members decided to have a short meeting every evening to report progress, and problems and discuss solutions to the problems. One was put in charge of recording their meetings. The Bureau of Water Management appointed one technician to design the facility and provide daily guidance. On August 15 the construction work started. Farmers were organized in groups according to their skills. Each group had one coordinator. Each household contributed labour (one family member), except for the old. Rules were formed to secure the contribution of labour. Those who could not contribute labour were required to pay for the labour hired instead, at15 Yuan a day. Otherwise, piped water would not be connected to their houses. They worked in high spirits. In one month, two water tanks and pump house were completed, and the main water pipes were placed.

During this period, another village meeting was called. The reason was because a dispute had arisen between the committee and the technician as to where to build the pump house. The committee members wanted it on the lower tank. But the technician insisted that it should be built in the field beside the tank. If it were sited on the tank, the tank would have to be reinforced. It would cost more money. If it were sited in the field, it would need a greater labour investment to install the footstones for the pump house. The dispute was reported to the township and GAAS team. The GAAS researchers suggested that the committee to consult the farmers whether

they preferred investing more labour or saving money. Saving more money meant the farmers could contribute less money. At first, both the technician and the committee did not like consulting the farmers again. The technician was used to commanding farmers, and to giving instruction. But in this project, he had to work with the farmers as partners, respect their opinions. He was not used to this change. The committee members thought they had no selfish motives; all their ideas and actions were for the good of the village. They had sacrificed a lot of time on the water system. So they felt they could make decisions for the village. One evening, the GAAS researchers joined the committee members' evening meeting. The researchers told the committee members that even though they were elected by the farmers to represent them, this did no mean they could make decisions for them. If they wanted to have farmers' support, they should respect the farmers and listen to them.

The second village meeting was called on September 9. The result was that most farmers wanted the pump house to be built in the field. But the main reason they gave in fact was not to save money. They thought the pump house on the tank would harm the tank and reduce its lifetime. One farmer said in the meeting: "this water system was not only for our generation, it also for our children and grandchildren" (Field notes, 23 September 2002).

The rest of work involved installing the pump machine, connecting the electricity and fitting the pipes, which required more professional skills. The farmers found the technician was not qualified for this work. Because of his improper technical guidance, some work had to be re-done and caused some materials to go to waste. The farmers also were not happy with his attitude. He often came to the site late, making the farmers wait for him. He did not go to the site every day. The committee asked the township to replace him with a more qualified technician. The township leader reported the farmers' requirement to the County Bureau of Water Management. The response from the bureau was that no extra-qualified technician was available at that time, because the Provincial Department of Water Management was going to evaluate the bureau's work; they had to prepare for that. Only once did the bureau send 4 technicians to the project site. The 4 people stayed in the village only half a day having a quick look of the site and enjoying a good lunch offered by the farmers. They did not give the farmers the technical advice the farmers had expected.

The Chaobai administrative village leader throughout was not happy that the farmers had not followed his suggestion to contract the project to the construction company. Through his relatives in Chaobai natural village, he spread the rumour that if the project had been contracted to the company, the Bureau of Water Management would have built a concrete road in the village, because the company was attached to the bureau. Hearing that, some of the farmers began to blame the people who had strongly supported the idea of building the system by themselves and they refused to work anymore. It was also said that the bureau was not happy with the farmers, because they refused to contract the project to its branch company since the bureau staff's premiums came from the company, the bureau did not

want to give this project good technical support. This project was supposed to be completed within two months before the harvest time in October. But by late September, a qualified technician still had not been found. And the rumours from the administrative village leader made the farmers feel bad, and the committee members feel pressured. It was harvest time. So the project stopped on September 25.

The committee initially had 7 members, but when the project stopped in late September because of harvest time and difficulties caused by the administrative village leader and the technician, 3 members (2 farmers and one village leader) left the committee. The committee worked very hard. Most farmers acknowledged their commitment, but some farmers doubted their motivation. They suspected the committee members got money from the project fund.

Two figures played important roles in the committee: Mr. X, the Chaobai natural village leader, and Mr. Y, a farmer, who is also a necromancer. They were both very active in the struggle to get the project back from the County Sanitation Office and had protested strongly against contracting the project to the company. As Mr. X said: "...to have tap drinking water was my father's dream. My father had tried very hard to organize the villagers to build a system many years ago, but they could not generate sufficient funds. So I have made up my mind no matter what difficulties we face, I will try my best. Good quality is our first concern. The drinking water system is not only for our generation but also for our children. My family supports me and the farmers trust me. The farmers chose me to be the committee member. I want to do something good for our village..." (Field note, 9 October 2002) Mr. X spent almost every day at the project site during the construction period. He lost money because he had no time for his own income generation activities. Mr. Y, as a part-time necromancer, has had more exposure to the world outside the village than other farmers. He had with high enthusiasm participated in village affairs. In the committee, he was the one to liaise with outside agencies, organizing materials, negotiating with the electricity station, helping in hiring the technician, and contacting the township government

From the point view of the committee members, organizing the farmers was not easy. The most difficult thing was building a sense of mutual trust. They tried to make the process transparent to the farmers. The financial management procedures followed those suggested by the CBNRM's small grant project management guidelines. They reported regularly to the farmers about the finances. At least 3 people went when materials had to be purchased. Receipts were submitted to the township counting office for reimbursement of the money expended. However, some farmers claimed to doubt the committee's financial reports, even though the committee had reported the record of expenses twice by posting the reports on a wall on the main road of the village. But the farmers said the papers are too small to read and the report was too complicated to understand. Some farmers wondered why the overhead was so high. The committee explained that they used the money to treat the electricity station staff, drivers and the hired technician, as listed in the overhead

item, together with the detailed amount spent on each occasion. The farmers said the committee members also treated themselves, using project money. But no evidence was provided for this allegation. The annual financial evaluations of both Kaizuo township and GAAS team showed the total expense of the project to be 69,000RMB (it would have been only 64,500RBM, but because of the unskilful technician an additional 4,500RBM was wasted).

Uncertainty of the bureau's cooperation

On September 26, the GAAS researchers and the township mayor visited the Bureau of Water Management (Field note, 26 September 2002). They met the director and vice director. First, the researchers expressed their appreciation of their cooperation in the piped water project of Chaobai village. Applying CBNRM to this project was a wonderful experiment, which had generated a lot of experiences and lessons for all of the stakeholders. The researchers briefed the two directors about the state of affairs in Chaobai village. Farmers were organized to contribute and take responsibility for their common good; rules and regulations were agreed and implemented for the facility construction, rules for post-management and follow up had been agreed, and it was clear to everyone that a water fee would need to be collected for maintenance. Two water tanks had been built and water pipes were in place. And the farmers had improved construction skills, which would help in future maintenance. But they noted, the technician the bureau had assigned to Kaizuo township was not qualified to finish the work. He was late arriving at the site every day; some of materials bought on his advice could not be used, which had caused 4500 RMB loss; the pipe joints were leaking water. The researchers asked the two directors to assign another qualified technician to Kaizuo township.

The director showed his willingness to work with GAAS team. He was interested in the experiment in Chaobai, especially in fact that the farmers were mobilized to take responsibility for construction and maintenance. He said that post-management of small-scale water facilities in both irrigation and drinking water projects was indeed a difficult issue. The bureau did not receive any funds for assisting the post-construction management work, but there were many demands. He gave an example: the previous week a township leader had come to him, asking him to provide help in repairing a pump station. The farmers had just used the pump, and not taken good care of it, because it was 'the government's', not 'theirs'. The township lacked funds and people to manage the pump station. There were hundreds of pump stations in the whole county; most of them were built 15-20 years ago. Maintenance was his great concern. He also mentioned that the technician was not used to working with farmers as equal partners. He was annoyed when farmers requested him to be on time and doubted his professional skills. He needed some time to get used to working with farmers. The bureau would also request him to change his attitude and improve his skills. But because the tension had arisen already between the technician and the farmers, it was decided in the meeting that the bureau would assign someone else.

During the discussion, the vice director raised two questions. One was, if the farmers can do every thing by themselves, construction, fund management, maintenance, what would be the bureau's job? Second, how much time and how much manpower would be needed to mobilize farmers to make such a contribution, accept responsibility and build their capacity? The GAAS researchers responded to his first question by asking about such tasks as the technical design of water facilities, technical guidance, quality control, channelling project fund, providing training for farmers, and necessary maintenance? The bureau would play important roles in all these and no one else could replace this kind of expertise and support. These would be the bureau's mandate and in fact the vice-director was clear about this. He was not so happy about abolishing the possibility of contracting out the working in the village. For the second question, the researchers' answer was this: from our experience in Kaizuo it is true that at the beginning of a project it would take some time (around 2 weeks to 2 months, depending on the complexity of the project) to understand farmers' interests, facilitate the organization of farmers and develop mechanisms (defining roles and rules) for involving farmers' participation in the decision-making process. However, as long as farmers were organized and the mechanisms were developed, the implementation would be easy and fast, and the post-management of the project would be much improved, because the farmers would share the responsibility for maintaining the water facility.

The vice director honestly raised his further concerns: would the quality of the construction be adequate; could it meet the time-constrains of project? His preference was that a facility was first constructed by the construction company, and then maintained by the farmers. His interest in CBNRM lay more in securing farmers' contributions to the construction and farmers' responsibility in facility maintenance, not in farmers' participation in the design, financial management, quality control, and other decision-making processes. From the GAAS team's point of view, farmers' participation in these decision-making processes is at the centre of CBNRM; CBNRM is not only about natural resource management, but also about how decisions are made to manage resources.

Two things were decided in the meeting: (1) the bureau would send another technician to Kaizuo Township; (2) the bureau would organize the bureau staff to make a study tour to Kaizuo project site, to learn from the experiences of community-based management, so as to apply CBNRM principles in other water management projects (Field note, 26 September 2002).

The project in Chaobai started again in December. A new technician was in place. But to the villagers' surprise his profession was not hydrology. By the time the township and GAAS team knew about this, the director of the bureau had been transferred to the Provincial Department of Water Management, and the vice director was acting in his place. The explanation from the bureau was that the bureau did not have enough technicians to assign one to each township. The township could not do anything about it, other than accepting the new 'technician' that had been assigned. No township wants to irritate the line agencies. Townships need to keep good relati-

onships with the line ministries in order to get more projects. Even though in the government system the township leader is of the same rank as the director of a line ministry, a township leader has less power in terms of project resources and a less favourable location in a township than in a line ministry. The status among the line ministries is based on how many projects each can secure: the more projects the more powerful it is. At present in Guizhou, the Agricultural Office, Forestry Bureau, Bureau of Water Management and Poverty Alleviation Office have more project resources than other line agencies. When a township leader is appointed to be director of a line agency especially of one of the 'powerful' ones, s/he is considered as 'being promoted'. The township leaders are pressured. They are located at the lowest level of the government hierarchy, directly facing the rural communities. On one hand, township leaders have to accomplish the tasks assigned by the county government, such as tax collection, or family planning. These tasks are the important indicators for evaluating their performance. On the other hand, the farmers make other requests to them, such as for public goods and service delivery. When there is a conflict in the demands or requirements between farmers and the country government and line ministries, township leaders mostly meet the latters' interests first.
The cooperation with the Bureau of Water Management over the piped water project in Chaobai ended at this point. In this situation, the Chaobai village committee decided to hire a technician from outside. The rest of work involved not so much labour costs. The technician, with the assist once of the committee members, connected the pipes, and installed the pump and the taps. The project was finally completed on the day of Chinese New Year of 2003, February 1.

Village institution for the drinking water system
The committee drafted the management regulations, with the reference to the piped water management regulations of Chaoshan village, which has been involved the CBNRM project since 1998. The draft regulations included water fee rate, water fee management, responsibilities of management staff, payment for management staff, responsibilities of the farmers, and enforcement mechanisms. The GAAS team suggested holding a village meeting to discuss the draft regulations. But this time the committee did not want to have a village meeting. They gave two reasons: (1) Chaobai is a big village; it is not easy to have a meeting with the majority of people participating. The regulations affected the day-to-day water use of all the people, so it should be reviewed by all. (2) They were afraid that the relatives of the Chaobai Administrative Village leader would make trouble in the meeting. So the committee preferred to distribute one copy of the draft regulations to each household for reviewing and feedback. 15 days later, the feedback sheets were collected. However, not many farmers gave comments on the draft regulations. It was assumed therefore that they agreed to the draft regulations. One farmer volunteered to be the maintenance manager. He had some skills in operating the pump machine. He has a good name in the village in term of willingness to help others, honesty, and a good relationship with other farmers. So there was no objection in the village.

The GAAS team, township officials and Chaobai villagers together evaluated this project in June 2003. The farmers believed the quality of the two water tanks and water pipes placement was good, much better than the ones in their neighbouring village, which was built by a construction company; they assessed quality in terms of the quantities of cement and steel used, and the depth the pipes were buried. They also compared the cost with their neighbouring village. The piped water system in Chaobai village was a bigger system but had less cost, and better quality. But the farmers were not satisfied with the water pipe connections; some of the connections leaked till the maintenance manager repaired them. According to the maintenance manager, some technical problems had not been solved: the pump machine leaked oil, there were fewer gates than needed; and the pump machine easily got hot. So further technical guidance was needed (Sun, 2004).

Analysis

I visited Chaobai village again in June 2006 for my PhD research. I asked the farmers whom I interviewed about their drinking water. They said they were highly satisfied with the management. The piped water had never stopped since the system became operational. The maintenance manager took good care of the facility and provided good services. The farmers agreed to the management regulations. The water fee was easily collected (Field notes, 12 August 2006).

The GAAS team's efforts to bring the farmers, township officials and the officials from Bureau of Water Management together in a cooperative way, had allowed farmers a stronger voice in decision-making. Although the partnership with the Bureau of Water Management did not work so smoothly, the project was seen as a good start, showing the positive impact that could be achieved by means of good facilitation in a multi-stakeholder interactive process. It was rare for the officials to go to a village and consult farmers' opinions, let alone to allow them to make decisions. And Chaobai villagers had gained the projects. They had dreamed about for so long. However, the case raises the question of whether a line ministry or the township officials could play such a facilitation role. If not, who else might do so in the many villages needing the support of government for water system development after the GAAS team's CBNRM project ends?

Trust building among the stakeholders was difficult but crucial. In this case, farmers did not believe the government officials wanted to do sometime good for them, and the officials did not trust farmers' ability to organize themselves to manage the piped water system. The technician of the Bureau of Water Management in the Chaobai village case did not know how to work respectfully, seriously, and fairly with the farmers. The bureau staff tended to be arrogant, indifferent, or even corrupt. So farmers hardly trusted them and remained hesitant to work in a collaborative mode with them. Farmers also did not wholly trust the Chaobai village committee. Some of them always doubted the members' honesty with regard to the project fund. This is not a single case in Kaizuo! Even though strict fund management was practised in the small grant project and regular reporting of expenses was also required, far-

mers' suspicions concerning the abuse of funds by project committees are reported occasionally. This emphasises the need of keeping the fund management transparent and of helping farmers to understand the financial report.

8.4.3 Cooperation with Changshun Agricultural Office

Cooperation with the Agricultural Office in a land terracing program provides another case of attempts to integrate CBNRM approach into the government system. The program was to terrace the hills (also called wastelands) along the contour, then plant (fruit) trees on the terrace. It aimed to control soil erosion, increase farmers' income, and control water loss by terraces with a fixed standard width of at least 2-meters. In order to meet the standard the hills must be broken and the soil has to be dug out to quite deeply to make the terraces. Based on my observation, this program in some parts of Guizhou does not achieve its objective but on the contrary, it damages the natural vegetation and results in more serious soil erosion. In many cases this program serves the purpose of creating more farming land out of the so called 'wastelands', i.e. places where farmers normally graze their animals. In the People's Congress of Changshun County in 2006, I raised my concern about the fixed terracing standard. The response from the county was that the standard was the uniform and unchangeable requirement that had to be met in order to meet the program evaluation criteria.

This project involved three sub groups in Kaizuopu natural village. The village has a large area of wasteland; the villagers wanted to use some of the hill wastelands to plant fruit trees. Village meetings were convened with the participation of the officials of the township and the Agricultural Office. The GAAS team facilitated the meetings. Agreements among the involved stakeholders were reached on where to establish the orchard, how large the orchard area should be, how to distribute the orchard trees among the farmers, what varieties of fruit trees were to by planted, and how to purchase the seedlings were to be purchased, etc.

During the early stage of the program, everything went smoothly. The villagers spent the whole winter in terracing the land, digging the planting holes and transporting manure to the new terraces. The technicians of the Agricultural Office and the township officials often came to the site to give guidance. But at the seedling purchasing stage, the county officials used their power to act unilaterally and ignored the agreement to buy saplings together with the villagers. The reason was that the county officials have an agreement with the seedling company. The quality of the seedlings supplied was lower than the ones on open sale at the same price. And the varieties were not the ones farmers wanted. According to the officials, that company did not have any of the varieties that farmers wanted, so they bought whatever the company had. The GAAS team insisted that the agreement should be followed and that seedlings should be purchased together with the farmers, but the responsible officer of the Agriculture Office said that he already wired the money to the company. The GAAS team deliberated its options but in the end felt compelled to pull out from this activity. The farmers refused to plant the seedlings, until a vice director of the

Agricultural Office came to the village promising the office would guarantee the quality of the varieties and provide timely technical advice. The GAAS team suggested that his promise be officially recorded. But the vice director did not dare to do so. He explained he was not given the right to sign documents. Without the written document the farmers could not believe his promises. The situation was rapidly degenerating into a stalemate. The thousands of seedlings were exposed to the sunlight. Tension between the farmers and the officials of the Agricultural Office was increasing. In order to help the County Agricultural Office, the township leaders came to persuade the farmers to plant the seedlings. The idea behind this offer is: 'I help you out this time, and you will help me if I have trouble'. It is called 'guanguanxianghu', meaning, officials protect each other.

One leader of the township was born in the village where the terracing program was implemented. Some of the farmers involved in the program were her relatives, including the administrate village leader. Her words had some influence on the farmers. They believed her. Some of the farmers began to plant the seedlings, then the others followed. However, the qualities of the seedlings were not as good as the Agricultural Office promised. The survival rates were low; some of the varieties had a survival rate less than 40%, and some 'peach' trees grew plum leaves. At that point, the farmers got angry. When they heard the news that the Agricultural Office had transported seedlings to another project site near their village, they organized themselves led by the administrative leader, and 'robbed' the seedlings. Conflicts between the farmers and the Agricultural Office rose again to a new pitch. But the Agricultural Office did not take any action. Soon after the 'robbing' event, the administrative village leader resigned, in order for the village to have future support from township government and line ministries. No more technical support has been provided by the government to the farmers.
The GAAS team felt very sorry that the scaling up effort had brought trouble to the farmers. They had not received any benefit from the terracing program; instead they suffered a lot.

Analysis
Farmers have very little political power to negotiate with the Agriculture Office. The GAAS team's facilitations in this case had very limited outcome. The underlying question is if a partnership can be built among the stakeholders when they have such unequal powers? Over and again, we have seen that the local government's driver is to make money, because they have to find funds to pay for staff and operational costs (Liu, 2006). Given this driver, how can they be open to good governance, and ready to learn together with farmers? This case also shows that strengthening farmers' capacity to become involved in public affairs that affect their lives without a corresponding establishment of venues for dialogue and adjustments in the government's procedures and priorities often renders the farmers vulnerable. This case made the GAAS team realize it must play its role seriously and take its respon-

sibility seriously. CBNRM action research is not to have fun with people! Any mistake can possibly bring loss to farmers.

8.4.4 Cooperation with the Animal Husbandry Bureau

At the start of the 21st century, the Chinese government showed a strong political will to achieve balanced development and a harmonious society in China. To increase farmers' incomes is becoming the government's major concern in order to narrow the expanding economic gap between rural and urban populations. A twin-track strategy is employed by the government, on the one hand reducing farmers' burdens and on promoting income generation on the other. Policies have been announced to restrict local government from gathering money from farmers, because apportioning the expenses of local government and the provision of public goods to farmers was considered one of the key constraints to the improvement of farmers' livelihoods. In 2006, the agricultural tax was banned in China. Income generation programs were launched, including animal husbandry development, agricultural enterprise development, market-based cash crop cultivation, or the industrialization of agriculture (large scale production and contract selling). Animal husbandry development has been identified by Guizhou Provincial Government as a key strategy to adjust the agricultural structure of the province and increase farmers' income.

It was agreed that the Animal Husbandry Bureau of Changshun county and the GAAS team would cooperate in a cattle raising and grassland management project in Kaizuo township. This joint project was to develop community-based institutions for sustainable grassland management and Animal Bank management. The bureau agreed to be responsible for providing grass seeds, calves or buffaloes, and necessary technical advice. The GAAS team agreed to be responsible for training on the CBNRM approach, mentoring the bureau staff in CBNRM practice and providing funds for a study tour to Sichuan Province. The project fund was issued to the bureau from the county. A 5-day study tour was organized in 2002 for farmer representatives (6 men farmers and 2 women farmers) and 4 government officials and technicians. Soon after the study tour, the GAAS team and the township government organized a reflection workshop in Kaizuo, so that the farmer representatives could share with the other farmers what they learnt from the study tour. And the farmers were mobilized and started to discuss the design of the project, such as how and when to circulate the 'seed animal' among the households in the villages; where, when and how to graze animals; who would monitor behaviour and enforce the rules, etc. But weeks later, the sad news came to the township that the project had been given to another township instead of Kaizuo! Hearing the news, the GAAS team leader immediately called the director of the Animal Husbandry Bureau asking for the reason. The director said that the township that had won the project had more favourable environmental conditions compared with Kaizuo. Later, the team was told by some friends in the county that the lucky township was the hometown of one county leader. He had moved the project from Kaizuo to his hometown. The GAAS team was annoyed. The team leader talked about this with a vice mayor. The

leader asked for understanding of the GAAS team. He said they had to play the game like this in officialdom. The so called balancing of relationships (pinghenguanxi) was an important skill for an official. The vice mayor promised to give this project to Kaizuo the next year. But both farmers and the GAAS team doubted his promise. Later, the director of the Animal Husbandry Bureau came to Kaizuo with some grass seeds as a sort of peace-offering. But the farmers refused her offer. The township leaders have to 'balance relationships', so they could not argue with the county officials; balancing relationships with farmers is not yet recognized as an equally important skill, and one that is increasingly necessary for harmony and good social order.

Analysis
"We have been used!" one GAAS researcher said when the news came that the Bureau of Animal Husbandry had moved the project out of Kaizuo. This case shows that the Animal Husbandry Bureau could not keep their commitment to the agreements made by all those involved. Even if there was commitment from the bureau, it was overruled by officials' relationship balancing. Trust can never be built unless the officials respect the agreements, and take farmers' interests seriously. Equal partnerships can never be achieved without trust among the stakeholders. Farmers are always the victims in these cases of unequal power. The case highlights the need to build a mechanism that ensures openness and fairness in the project competition process. Mechanisms are also needed to ensure that government officials feel themselves accountable not only to their bosses but also to the people. Otherwise the price paid for building balanced development and harmonious society will be much greater.

8.5 Discussion and conclusion

CBNRM places the interests and needs of local resource users at the centre of natural resource management. It advocates local people's stakes and rights in using and managing the resources on which their livelihoods depend. Thus, CBNRM requires the active participation of local people in decision-making. This requirement challenges the government's conventional top-down decision making system, changes existing institutional structures and the relationships between stakeholders. Not many officials are willing to share power with local people. In the successful cases presented and analysed here the officials and line ministries came to recognise that the CBNRM projects actually augment their power to meet centrally-determined targets and tasks, and increases their visibility vis-à-vis higher powers. In the other cases a less positive experience confirmed their conviction that power is rightfully theirs and should be jealously guarded in these cases. They did not develop an awareness that their own high-handed actions contributed in a major way to the disappointing outcomes.

CBNRM also changes the structure of incentives to act in certain ways. New rules and values mean that performance criteria, accountability mechanisms and decision-making processes open up the possibility of new forms of action - but they also close off opportunities that might lead to other kinds of individual or collective benefit. The collective agreements negotiated at village level, for instance in the case of the Dabuyang Animal bank or the Chaobai water system, proved effective in this respect. But the collective agreements negotiated between villagers and line ministries or higher level officials in other cases did not result (so far) in lasting change in the incentive structure that guide individual and collective actions at those levels. Even individuals well-disposed to the CBNRM scaling up experiments found themselves constrained to respond to the conventional incentive structures. These have a formal expectation that they will obey orders and informal character (e.g. pinghenguanxi, guanguanxianghu), and new and forceful economic drivers. These incentives and drivers condition officials' and line ministries' survival, official recognition, and promotion.

The cases of Chaobai village and Kaizuopu village illustrate the reactions of government officials when farmers participate in decision making for project implementation. Government officials lack motivation and incentives to apply CBNRM even though they recognize the value of the CBNRM approach, also because their performance is assessed only by higher-level officials and their promotions are also decided by the higher-level officials. Under this institutional structure, they hold only upward accountability not downward to farmers. The conclusion from these cases is that scaling up CBNRM cannot be achieved unless the institutional structure and bureaucratic orientation of Chinese government is changed. Bardolf (1998) and Nilanjana (1998) point out that the philosophy of the participatory approach has profound implications for how institutions function and how they are structured. This reality is by far the biggest challenge to the widespread use and scaling-up of the methodology. The cases also highlight the absence of mechanism that would make line ministers and officials accountable to the farmers. CBNRM, as the case of working with the Forestry Bureau on reforestation shows, can help to structure such a mechanism, involving joint negotiation of agreements, the opening up of spaces and channels for discussion and resolution of disputes, and by encouraging officials to visit and learn from farmers' experiences. But these 'soft' mechanisms assume the active good will and interest of higher powers - and they do not survive and are not effective in the face of indifference or behaviour that bows to other pressures.

The experiences with horizontal and vertical scaling up experiences also forced the GAAS team to reconsider its own position. This had two dimensions. On the one hand it brought home to the team that they were intervening in an existing field of power. Moreover, they were not a neutral power player (despite their deliberate choice to play a 'facilitating' role), because they were already deeply committed to CBNRM principles and the integrity of their experiences at village level. Did their scaling up experiments unbalance the field of power? Did they further tip the balance against the farmers or manage to open up new win-win possibilities for all the

players? The GAAS team reflected on the balance between sticking to CBNRM principles or keeping good relationship and cooperation with government even though this meant compromising CBNRM principles. It was difficult to have 'Yes' or 'No' answers in the extreme. Then what is the balance? And to what extent is it their interest to pursue 'large scale in a short time'? These are serious questions for a change agency like the GAAS team. The second dimension has an ethical character. The GAAS team from the start has challenged its own ethical position in its relations with villagers. It has tried to 'walk the talk' captured in CBNRM principles in the way its works with villagers and other stakeholders. But the cases recorded here brought home forcefully to the team that scaling-up brings larger ethical risks. The experience of working with farmers and officials has made the team realise even more strongly its role and responsibility in action research. Any mistake can bring farmers' loss, cause conflicts or even damage the resource system, as the cases of goat raising in Dabuyang, the Niuanyun Animal Bank, and fruit-tree planting in Kaizuopu show. The case stories of the GAAS team working with different government line ministries show that to promote CBNRM in China requires more than simply a change in approach to managing natural resources. It requires decentralization of government and participation of local users in decision making, so as to have locally accountable representation and power of decision-making. Therefore, scaling up CBNRM is about the balance of power, policy change, institutional development for bureaucratic reorientation, and good governance. These changes and improvements cannot happen overnight: they need consistent and innovative efforts.

The conclusion of this chapter is a paradox. The GAAS team has shown that it is possible to scale up CBNRM, given certain favourable conditions, but also that in reality these conditions rarely exist and are in any case vulnerable to more powerful forces. The chapter however also shows that harmony, good order, and the need to diversify rural livelihoods, increase farmers' incomes, and manage natural resources sustainably cannot be driven by top-down government efforts alone. The achievement of national goals means that an effective partnership with villagers is required. CBNRM processes can help build that partnership. In the final chapter therefore some suggestions are made as to how to find a way out of this paradoxical situation.

9 Learning from everyday CBNRM practice: conclusions

Community-based natural resource management (CBNRM) has attracted considerable attention from researchers and practitioners in recent decades (e.g., Tyler, 2006b). CBNRM advocates common property rights or co-management of natural resources. It has taken poor people's local needs and interests into resource management practice and theory. It argues that without local people's active participation in natural resource management it is impossible to achieve sustainable development, especially in the areas where local people rely on the natural resources for their livelihoods or even their survival. It hypothesises that only if our efforts deal seriously with their livelihoods, people would act as resource protectors rather than as a force of resource degradation. At the same time, CBNRM accords high priority to equality in natural resource management. Local people, especially the marginalized groups (most often the poor, women and ethnic people) must benefit from development and their livelihoods must not be compromised by environmental protection agendas without any due consideration. For these reasons, CBNRM has been recognized as a people-centred and community-based approach.

CBNRM has been tested and promoted in many countries in the last two decades. It was introduced in China in the 1990s. The GAAS team is one of the pioneers practising CBNRM in a poor area of China. More than ten years later it is time to analyse whether and how a CBNRM approach contributes to the two seemingly distinct aims of sustainable natural resource management and improved livelihoods for the rural poor. The issues pursued in this thesis thus are: How does CBNRM work and why? What are the outcomes and why? What are the strengths, weaknesses, opportunities and threats of CBNRM in a country such as China with its rapid economic development and socio-political transformation? What are the policy implications in relation to China's increasing resource degradation and environmental management problems?

This study took the GAAS team's CBNRM initiative as its research 'object' and proposed the following research questions: (1) How does CBNRM promote (new) community institutions for collective action in natural resource management, specifically the common-pool resources including grassland, forest and forestland, and water resources? (2) How and in which way these community institutions and the results they produce (what we could call performance) are shaped and conditioned by both internal and external factors? (3) How do these local institutional innovations link to policy-making?

In addressing these questions, this study reviewed and investigated how the shifts in resource management regime affected the way local people managed natural resources over the last 50 years. It also empirically explored the interests of the different stakeholders and the dynamics of their relationships as they pursue their stake-holding in natural resources. It then analysed the effects of the GAAS team's

CBNRM action research and facilitation efforts on community institutional development and partnership building among stakeholders. It assessed evidence for the performance of (new) community institutions for common-pool resources management and improvements in the lives of farmers. Finally, it explored the GAAS team's efforts to scale up CBNRM to the government system and to a larger area.

9.1 Major findings

9.1.1 Property right arrangements determine the way people manage their natural resources

The literature review and the empirical case study in Chapter 6 showed that the constellation of property rights governing natural resources determine people's behaviour and practice in natural resource use and management. Different property regimes result in different management outcomes. The land reforms in the 1950s and late 1970s radically shaped the way local people managed natural resources in rural China. The introduction of the Household Contract Responsibility System (HCRS) led to a sharp increase in productivity of arable land but also to dramatic degradation of forests and grasslands and seriously damaged irrigation systems. This was discussed in detail in Chapter 2. Under the HCRS, the ownership of arable land, forestland, grassland and small-scale water resources (except the state-owned ones) were vested in the rural collectives, e.g., so-called natural villages. But the use rights of these resources were contracted to individual farmer households or to a group of farmer households (for forests and grasslands). In other words, through this contract system, the use rights of collectively owned resource were privatized to rural farmers. Evidence from several research studies and this PhD study shows that the HCRS increased production of farming land but failed to promote sustainable management of forest, grassland and water resources. The question here is why HCRS had these effects on the ways local people manage arable land and other natural resources.

Many debates around the 'why' question have taken place among scholars. The arguments have concentrated on unclearly defined property rights (e.g., Ho, 2005) and lack of proper institutions to implement laws and policies that support the HCRS (e.g., Zhang & Kant, 2005). Of course, clearly defined property rights and effective implementation institutions are important preconditions for sustainable natural resource management, but they clearly are not sufficient. The evidence drawn from the literature and this thesis shows that the existence and functioning of local institutions or community-based institutions also condition sustainable resource management, in particular for resources that have the attributes of common-pool resources, i.e., that are characterized by subtractability and high transaction costs for exclusion, such as forest, grasslands and water resources.

Given that the collective ownership of natural resources was created somewhat abruptly, it is not surprising that the natural villages were not well prepared to prac-

tise their collective ownership. This is evidenced in (i) poor awareness of villagers of their common property rights (the historical effect on collective life of the commune time also influenced their perceptions), (ii) the absence of in local institutions, and (iii) the general lack of capacity of villagers to manage their known affairs. These three contextual issues proved in the present study to be critical in explaining some aspects of the performance of local stakeholders in collective management of their natural resources; in particular, their common-pool resources, in relation to issues of sustainability, effectiveness and fairness. The property reforms in China that have led to the privatization of use rights of forests, grasslands and small-scale water resources, as this thesis shows, have not achieved the objectives of environmental improvement nor sustainable economic development.

9.1.2 Importance of institution development

Creating or strengthening community institutions for collective management of common-pool resources requires sustained efforts. The GAAS team's efforts to create or strengthen communities' capacity to undertake institutional development had mixed results. The efforts at the different times and places documented in this thesis addressed four main themes: village-based institutional developments and capacity building (Chapter 6); institutionalization of CBNRM through scaling up (Chapters 8); linking community institutions to other administrative levels or institutions operating at wider scale (Chapter 8); and bridging stakeholders' different interests to achieve concerted action (Chapters 5, 6 and 8).

Village-based institutional development

As discussed in Chapter 3, institution in this thesis refers to a set of rules and norms that constrain human action (North 1990: 3). Specifically in this study, community institution is taken to mean a set of rules and regulations defined by and accepted by collective resource users (farmers or rural villagers) to determine who has access to and control over their grassland, forest and forestland and water resource, and how to enforce these rules and regulations. The GAAS team facilitated the building of community institutions for common-pool resource management in a participatory manner in a number of villages. The work included arrangements for collective grazing and grassland management, village forest management regulations and enforcement mechanisms, management systems for drinking and irrigation water resources, and the Animal Bank. These institutions profoundly improved natural resource management, as evidenced by both subjective and objective monitoring and evaluation data. The Dabuyang case presented in Chapter 6 provided strong evidence that effective community institutions are vital for sustainable common-pool resource management (in this case, grassland, forest and forestland and water resources). This confirms the conclusions of other researchers (e.g., Ostrom, 1990; Wade, 1987).
The evidence analysed in Chapter 7 supported the positive impact of community institutions on the management of assets (natural, human, financial, social and physical) considered essential for people's livelihoods.

The effects and outcomes of community institutions are affected by both internal and external factors

The GAAS team has discovered that multi-scale, multi-sector institutional development is not a one-time process of design and start-up activity. This study shows instead the need for sustained investment in an evolving learning process, responding to changes and pressures both within and from outside the communities concerned. For the convenience of discussion, I categorize the most influential factors into two internal factors and external factors. The internal factors refer to the features or situation of the resource users and the resources in question, such as user group size; the external factors refer to government policies, measures taken by government organizations to implement policies, the administration practices of local government, interventions by research institutes and market forces.

The empirical studies presented in Chapter 5, 6 and 8 revealed that the effects of community institutions on common-pool resources are influenced or conditioned by both internal and external factors. The interplay of the internal and external forces leads to the actual (but temporally and spatially variable) outcomes for natural resources and their management. Both internal and external factors are embedded in a certain socio-economic and political context and they are shaped and reshaped by particular socio-economic and political parameters. The statistical analysis presented in Chapter 7 indicates that the community institutions in different villages have delivered different performances when assessed in terms of livelihood assets although they were supported under the same CBNRM interventions.

Taking as a paradigmatic case, the stories of the Animal Bank presented in Chapter 8, as an example of a community institution promoted by the CBNRM project, we can conclude the following. The same institutional arrangement resulted in varied outcomes in the different communities although they are located in the same township. What accounts for the different outcomes? The internal factors that played important roles in shaping the Animal Bank's outcomes include ethnic tradition (Dabuyang's Hexinhui), leadership (Jichang village), homogeneity of the user group (Xinzhaiyuan village) and users' ability to implement the rules. However, the external factors, such as township government's push to promote large-scale economic development motivated by the government performance evaluation system, clearly dictated the success or failure of the Animal Bank in one instance (Niuanyun village). The story of the Animal Bank implies that community-level institutional development is not and cannot be totally a community issue. This thesis thus argues that the design principles developed by New Institution scholars (e.g., Ostrom) are too simplistic to apply wholeheartedly in different contexts, because they are too much focused on the internal factors and ignore the external forces. Ignorance of the external factors and the socio-economic context in which they are embedded would lead to failure in community institutional development.

9.1.3 The ever increasing competing claims of multiple stakeholders on natural resources require concerted actions to achieve sustainable management

The stakeholder analysis in Chapter 5 demonstrated that the process of the opening of the economy toward the market and strong macroeconomic development has increased the severity of struggles for access to and control over natural resources. More stakeholders, some with similar, others with different interests, are becoming involved in resource claims. Within the same community different groups of farmers compete with each other, for varied purposes, over resource use. For example, the case of the grasslands presented in Chapter 5 shows how villagers compete to use the resource for grazing cattle, buffaloes, goats and for harvesting fern sprouts. A single farmer is seen 'competing with himself or herself' over the same resource as he or she follows different livelihood strategies. As such, a farmer is a cattle owner but at the same time he or she is also a goat raiser or fern harvester and thus with an interest in multiple but competing ways of managing the resource. In addition to the local community's farmers, other stakeholders reach out to enjoy community-based natural resources. These include the township government, businessmen, and a range of the line ministries (the Forestry Bureau, the Bureau of Land Administration, the Bureau of Animal Husbandry, etc.). Each of them guards a different set of interests and exercises his stake-holding in terms of his own technical and operational interests. These competing claims result in a complexity of relationships, struggles and uncertainty of outcomes.

The discussion of the government administrative structure (given in Chapter 5) showed why the line ministries responsible for natural resource management have failed to coordinate their actions in resource administration. This problem is rooted in higher hierarchical levels, principally, that is, at the ministry level. The resulting tension is aggravated by the segmented structure of the ministries as well as by the overlapping and often contradictory mandates among different ministries over the same natural resources. This thesis has presented and analysed the web of bureaucratic interests battling for the control of grasslands or wastelands. It shows how this leads to further land degradation and to victimization of local farmers - who are blamed for all the poor management practices and related problems that result. What emerges is a picture of multiple stakeholders with diverse and changing interests, and interactions among stakeholders that are not linear but rather fluid and multi-sided, resulting in a web of complex relationships formed around the resource(s) under consideration. This is not a problem that can be solved by technology alone or by a one-off project-based intervention.

The relationships are moreover informed by asymmetries of power. However, just to understand how these power relations are played out is not enough when intervening in a situation of environmental degradation. Based on understanding, actions need to follow. In giving concrete form to this key insight, the GAAS team made efforts to facilitate the formation of so-called platforms (a common social space) that would allow stakeholders to communicate, negotiate and build trust. The aim was to

reach agreement across power divides to enable collective decision concerning natural resource use and management. It was hoped that these platforms would lead to concerted actions by the multiple stakeholders although they had diverse interests, as they realised that they could only score their own goals through collaboration with others. The GAAS team realised that the most important function of the platform would be to balance (rather than trade-off) the different stakeholders' interests, in other words, to balance power relations, specifically to empower the disadvantaged by providing spaces in which they could voice their needs and interests and to be taken into account in decision-making.

However, in the everyday practice of developing and using these platforms, the GAAS team had to deal incessantly with top-down bureaucracy. The cases presented in Chapter 8, illustrate how the cross-scale asymmetry in power relations posed mostly insurmountable difficulties in achieving a more equal participation of stakeholders in decision-making and collaborative action in natural resource use and management. This thesis concludes that collective efforts of learning through interaction among stakeholders are fundamental for successful CBNRM, but that concerted actions among multiple stakeholders with different interests can hardly be achieved unless the bureaucratic orientation and institutional structure of the Chinese government changes. The evidence of this thesis also shows that market forces encourage trade-offs among competing interests that, in conditions of asymmetrical power, favour the better-off and well-connected. Effective CBNRM requires a certain congruence in the incentives for action that are shared by the stakeholders concerned.

9.1.4 Scaling-up CBNRM is challenged by top-down structures

A situation of competing claims on natural resources indicates that community institutions are not operating in a void. Rural communities are no longer isolated and self-contained small societies, but have been opened-up to the outside world by rapid economic development or so called modernization. Community institutions are affected, and in most cases, challenged or even threatened by outsiders with non-local interests. CBNRM promotes sustainable and equitable natural resource management by placing the needs and interests of local resource users at the heart of natural resource management through community institution building and capacity building. Yet in order for community institutions to be sustainable and function more effectively, we have learned that they need to be linked to government policies that can provide a supportive institutional framework. This insight was at the heart of the GAAS team's attempt to scale up CBNRM. The GAAS team used vertical and horizontal scaling up strategies to integrate CBNRM principles into government programmes and to expand CBNRM to larger areas.

The examination of the GAAS team's scaling up process and outcomes, which is presented in Chapter 8, reveals that it is possible to scale up CBNRM, given certain favourable conditions, but also that in reality these conditions rarely exist and are in any case vulnerable to (more) powerful forces. This is a paradox. CBNRM requires

the active participation of local people in decision-making. This requirement challenges the government's conventional top-down decision making system, existing institutional structures and the relationships between stakeholders. In the cases presented and analysed in Chapter 8, some of the officials and line ministries came to recognise that the successful CBNRM projects actually augment their power to meet centrally-determined targets and tasks, and also increase their visibility vis-à-vis higher powers. In the other cases, a less positive experience confirmed the officials' and line ministries' conviction that power is rightfully theirs and should be jealously guarded. They did not develop in these cases an awareness that their own high-handed actions contributed in a major way to the disappointing outcomes. This is a fundamental but also painful lesson learned by the GAAS team.

CBNRM also changes the structure of incentives to act in certain ways. New rules and values mean that performance criteria, accountability mechanisms and decision-making processes open up the possibility of new forms of action - but they also close off opportunities that might lead to other kinds of individual or collective benefits. The collective agreements negotiated at village level, for instance in the case of the Dabuyang Animal bank or the Chaobai water system (see Chapter 8), proved effective in this respect. But the collective agreements negotiated between villagers and line ministries or higher level officials in other cases did not result (so far) in lasting change in the incentive structures that guide individual and collective actions at those levels. Even individuals well-disposed to the CBNRM scaling up experiments found themselves constrained to respond to the conventional incentives. The conclusion is that scaling up CBNRM cannot be achieved unless the institutional structure and bureaucratic orientation become truly supportive of CBNRM.

Bardolf (1998) and Nilanjana (1998) point out that the philosophy of participatory approaches has profound implications for how institutions function and how they are structured. The reality is that existing conditions are by far the biggest challenge to the widespread use and scaling-up of the CBNRM methodology. CBNRM can encourage joint negotiation of agreements, the opening up of spaces and channels for discussion and resolution of disputes, and the encouragement of officials to visit and learn from farmers' experiences. But these 'soft' mechanisms assume the active good will and interest of higher powers - and they do not survive and are not effective in the face of indifference or behaviour that bows to other pressures.

Therefore, wider adoption of CBNRM in China would require more than simply a change in approach to managing natural resources. It would require decentralization of government and an opening up of space for the participation of local users in decision making, so as to have locally accountable representation and a wider sharing of power in decision-making. These conditions are not easy to create or sustain, even in so-called democratic societies. Scaling up CBNRM in China would involve managing transitions in the balance of power, policy change, institutional development for bureaucratic reorientation, and incentives and mechanisms of local accountability for good governance. These changes and improvements could not happen overnight: they would need consistent and innovative commitment.

9.1.5 Facilitation by the GAAS team was crucial

CBNRM assumes the active participation of stakeholders, especially of the local resource users, who, through a process of learning by doing, embark on a road to better understand the inter-dependence among their particular interests and concerns. It is assumed that the methods of inter-action and dialogue around actions that address the management of resources in which all parties have a stake, can effectively bring these divergent interests and concerns toward convergence around a shared natural resource governance regime. Thus, the GAAS team's first facilitation effects focused on involving different groups of farmers, especially the marginalized groups, in decision-making and actions regarding natural resource management. Facilitation also focused on helping in clarifying clear use rights of the resources, setting up management groups, organizing collective actions, establishing management rules, and creating common spaces for negotiating, agreeing, monitoring, and reinforcing rules for regulating access and sustainable use of natural resources. This was all done in a spirit of experimentation. Later on, during the CBNRM scaling up period, the emphasis of the GAAS team's facilitation shifted to developing partnership among stakeholders (farmers, line ministries, township government, and private sectors), including platform building for communication, negotiation and reaching agreement; coordinating agreement implementation and conflict management; providing training on CBNRM principles and methodology to stakeholders; and building trust among stakeholders and fostering synergy.

Evidence examined throughout the empirical chapters of this thesis suggests that the GAAS team's facilitation efforts have been critical in the success of CBNRM practice and CBNRM scaling up. However, two critical issues surfaced in the process of exploring how to be good facilitators: (i) facilitation does not always produce positive outcomes; (ii) the effects of facilitation are limited by unbalanced power relations.

It is important to point out the GAAS team's facilitation efforts did not always result in 'getting things right' but also led to 'getting things wrong'! The GAAS team's facilitation sometimes created new conflicts or added fire to existing conflicts. The case of the Xiaozhai mill house is evidence of the latter. As we discovered in practice, 'facilitation itself is a form of power' (King 2000: 272). In this regard, the GAAS team was not a neutral power player. The team members' understandings, values and interests strongly shaped the CBNRM processes. This study reveals the important necessity for a change agency or for action-oriented researchers, such as the GAAS team, to critically reflect on their values, interests and practices. This kind of reflection is the responsibility of any serious researcher. Uncritical reflection and unserious actions could bring about serious or widespread negative effects, such as the victimization of farmers or could lead to conflicts or even further damage the resource base.

Facilitation is also about balancing power among stakeholders so that an effective participatory process can unfold (Groot, 2002). This study shows that power is hardly shared but remains in the hands of a few influential stakeholders, such as the line

ministries. The unbalanced power relations rendered the facilitation efforts of the GAAS team to open up new win-win situations for all stakeholders rather unpromising. In the end, so it seems, farmers are always the losers. The case of the fruit-tree planting in Kaizuopu analysed in Chapter 8 provides the example. This study thus emphasises the necessity to pay particular attention to power relations when facilitating CBNRM practices. Otherwise, a team may run a risk of making disadvantaged stakeholders more disadvantaged or, worse, becoming manipulated by more powerful stakeholders. The notion of local people's participation sometimes becomes an excuse for local officials to require local people to contribute labour, money or materials against their consent; this tendency had to be fought off on several occasions by the GAAS team.

9.2 Discussion of the findings' relevance to the changing Chinese context

9.2.1 Significance of the study

The Household Contract Responsibility System, with collective ownership but privatised use rights in natural resources, has had negative effects on common-pool resources, specifically on the forest, grassland and water-related facilities researched in this study. The increasingly serious grassland degradation, deforestation and poor maintenance of water facilities have driven Chinese authorities to find solutions for these inter-related environmental and development problems. CBNRM is one of the options that have been tested in rural China since the 1990s, mostly supported by international donors. But how CBNRM works and why, what the potentials and limitations of CBNRM are and what the conditions might be for successful implementation of CBNRM in China have not been profoundly explored and systematically analysed. This study tried to understand these critical questions by deeply exploring and analysing the processes and outcomes of the GAAS team's CBNRM initiative in rural Guizhou. This thesis systematizes these understandings. The insights and conclusions generated have logical, evidence-based policy implications for China's common-pool resource management.

Guizhou is one of the poorest provinces in China, with a fragile ecological system (Chen, 2000). The incidence of rural poverty in Guizhou is high, accounting for 10.6% of the national rural population experiencing poverty in 2004 (Wang, et al., 2006). Guizhou province is a typical upland region with 92.5% of its territory made up by mountains and hills, and 61.9% of Karst (GZGOV, 2005). Deforestation and degradation of grasslands have caused large-scale rocky desertification in the province. Agriculture is the major livelihoods of the Guizhou rural poor. They heavily rely on the fragile natural resource base for their subsistence. Unfortunately, the regional development policy for poverty alleviation has failed to reach the poorest households (Li & Remenyi, 2004), and the south-western regions, including Guizhou, continue to suffer. The technology-centred remedial strategies of the government

have not helped to improve the livelihood situation so far, nor did they stop further degradation of the natural resource base. There was therefore an urgent need to explore alternative, more holistic approaches that focused on poor rural people and innovative ways to improve their lives through local interventions in natural resource management. CBNRM action research emerged through analysis of experience elsewhere as such a suitable alternative in Guizhou.

Common-pool resource management for sure is a global issue. As the process of globalization expands, an increasing number of natural resource management issues reach out to include multiple stakeholders across different institutional scales from local to regional, national or even global levels. What has been called the resource dilemma (competing claims by interdependent stakeholders with diverse interests) is a major challenge faced by human society (Röling, 2002). The solution to these dilemmas is not to just rely on 'talking together', but on 'taking action together' (SLIM, 2004). How multiple stakeholders with different backgrounds and interests reach concerted actions towards sustainable natural resource management, and under what contextual and policy conditions, is a hot, but unresolved question. This research contributes evidence-based lessons for answering this question. Many developing countries are experimenting and promoting a CBNRM approach, in Asia (Tyler 2006b), Africa (ARD-RAISE, 2001) and Latin America (Carter & Currie-Alder, 2006). This thesis provides reference material that may be useful to other researchers and practitioners all over the world. It could be particularly useful for other former socialist countries, which are undergoing similar socio-economic transitions from a central planning system to a market system.

Concerted actions need facilitation and coordination. But who should or could play the role of the facilitator and coordinator? What conditions should be created for effective facilitation and coordination? In this CBNRM initiative, the GAAS team played a role of facilitator and coordinator. Can the GAAS team or other research institutes or NGOs continue to play their roles after the international financial support stops? Then, who else could be the coordinator?

9.2.2 Environmental challenges and environmental policies

Environmental problems

China's economy has achieved remarkable growth. Over the last 15 years, the average rate of economic growth has been 10.1% per year. However, rapid economic growth, industrialisation and urbanisation have put enormous pressure on the country's environment, with consequent damages to human health and natural resources and the potential for further development (OECD, 2006). According to an environmental performance review conducted by the OECD in 2006, China's environmental problems are rated as severe. The list of problems ranges from air pollution, biodiversity loss, cropland losses, depleted fisheries, desertification, disappearing wetlands, grassland degradation, and increasing frequency and scale of human-induced natural disasters, to invasive species, overgrazing, interrupted river flow,

salinisation, soil erosion, trash accumulation, and water pollution and shortages (SEPA 1999 cited in Liu & Diamond, 2005). Here are some figures to illustrate the serious environmental situation in China:

- The losses from pollution and ecological damage ranged from 7% to 20% of GDP every year in the past two decades (Guo, X., 2004 cited in Liu & Diamond, 2005:1183)
- Soil erosion affects 19% of China's land area. The sediment discharge from erosion from the Yangtze River exceeds the combined discharges of the Nile and Amazon, the world's two longest rivers (SEPA, 1999 cited in Liu & Diamond, 2005: 1181).
- About a third of the water courses are severely polluted (SEPA, 2007), and the quality of groundwater sources is also poor and declining (Liu & Diamond, 2005:1182; OECD, 2006 : 6)
- 10% of Chinese cities suffer acid rain in 2004(i.e., pH under 4.5) (OECD, 2006:4)
- Desertification has affected more than a quarter of China, due to overgrazing and land reclamation for agriculture (Liu & Diamond, 2005:1182)
- Pollution and resource competition have triggered numerous social clashes in China, including 18 conflicts over forest resource management in south-western China compiled by the Food and Agriculture Organization of the United Nations in 2001 (Liu & Diamond, 2005: 1183)
- Droughts damage about 160,000km2 of cropland each year, double the area damaged in the 1950s (Liu & Diamond, 2005: 1183).
- The 1998 flood killed 4,150 people and caused 25.5 billion RBM direct economic loss, because of rapid deforestation and desertification (The Ministry of Water Management, 1999).
- 15-20% of China's species are now endangered (The World Bank 2000 cited in Liu & Diamond, 2005:1183)

The list could be much longer; each figure is a shocking fact. A critical moment has come for China to take action to fight these environmental problems.
Environmental issues have in fact been the Chinese government's concern since the late 1970s. Soon after the economic reform in the late 1970s, China began to systematically establish an environmental regulatory system. Various environmental laws have been developed, which include the state Environmental Protection Law (enacted in 1979 and revised in 1989), Forestry Law (enacted in 1984 and revised in 1998), Grassland Law (enacted in 1985 and revised in 2002), Water Law (enacted in 1988, revised in 2002) and the Law of the People's Republic of China on the Protection of Wildlife (enacted in 1989). These laws provide a framework for pursuing sustainable development and environmental progress. A range of detailed regulations has also been developed to guide the implementation of these laws. Taking Forest Law as example, the State Council has issued a total of 12 sets of fore-

stry-related executive regulations, such as the 'Regulation on Forestry and wildlife Protection Area Management', the 'Pamphlet on the Implementation of the Forestry Law', 'Regulations on Forest Fires' etc (Liu, 2006). Besides these comprehensive and modern sets of environmental laws, the Chinese government has also established or strengthened state environmental institutions: the State Forestry Bureau was funded in 1978 (separated from the Ministry of Agriculture), and the State Environmental Protection Bureau was established with equivalent offices in the provinces in 1998. In addition, the central government has strengthened the Ministry of Hydrology and the Ministry of Agriculture with more authority and programmes. These institutions are responsible for enacting and implementing the various environmental laws and regulations. Campaigns and award schemes to support implementation at the local level have been organised. To protect its biodiversity, for instance, China has established 1757 national and local nature reserves, mostly within the last 20 years. They cover about 13% of the nation's area (Liu et al., 2003:1240).

However, these efforts have not been sufficient to keep pace with the environmental pressures and challenges generated by the very rapid growth of China's developing economy nor to capture the potential economic benefits to be obtained from improved pollution abatement and nature protection. Overall, environmental efforts have lacked effectiveness and efficiency, largely as a result of an implementation gap. The weaknesses in the present system are demonstrated by the failure to achieve the objective of environment degradation control. The biggest obstacles to the environmental policy implementation are at the local level. The performance objectives of local leaders, the pressures to raise revenues locally to finance un-funded mandates, and the limited accountability to local populations have generally meant that economic priorities have over-ridden environmental concerns (OECD, 2006). This issue is also reflected in this thesis. Deforestation, desertification, and biodiversity loss are thought likely to worsen with progressive urbanization and commercialization (Ho, 2005). The tenure systems of forest and grassland defined in the Forestry Law and Grassland Law have little credibility and have ineffectively and poorly functioned because of the unbalance between the tenure systems and socio-economic parameters (Ho, 2005). Ho terms the tenure system rests on 'empty institutions' (only a paper agreement with little effect on the behaviour of social actors), and pointed out that these 'empty institutions' have created social conflict, environmental degradation and the victimization of farmers. Too much focus on large-scale technological development (in terms of hard technology), lack of co-ordination between state authorities and departments, and restricting citizen involvement are also obstructing the environmental protection efforts (Mol, 2006).

Balancing growth and development

The historical flood in 1998 in China, which caused thousands of deaths and serious economic losses, made the Chinese government realize the numerous environmental costs of rapid economic growth, and opened their eyes to the interplay of

environmental degradation and rural poverty. Since then, the government has promoted more balanced patterns of development, using concepts such as 'harmonious society' and 'balanced development'. In 1999, the government launched the Western Region Development Strategy as one of its major efforts towards to balanced development and a harmonious society. China's ecological crises are particularly severe in its western region where rural poverty, ecological fragility and economic underdevelopment are interwoven (Wu, 2003). The strategy aims to reduce economic disparities between the western and other regions and to ensure sustainable natural resource management.

It is important to mention that democratic progress also has been made in rural China since the promulgation and implementation of the Organic Law on Village Committees in 1998. The law authorizes rural villagers to choose village leaders through free elections (Haixuan), indicating the beginning of people's participation in grass-root politics in rural China. The democratic election of administrative village leaders and natural village leaders has provided the possibilities to have effective community institutions presenting the common interests of its members with transparent decision-making and accountability. In late 2001, the State Leading Group Office for Poverty Alleviation adopted a participatory approach in village poverty reduction planning in poor rural areas of China, aiming to improve the poverty reduction to better targeting of the poor and to respond to more situation-specific needs of the poor (Li & Remenyi, 2004). The adoption of participatory poverty reduction planning marks a departure from traditional top-down planning to the community-based methodology, and also shows a willingness of the Chinese government to explore poverty reduction methods based on local participation, gender targeting, and community-based planning (Li & Remenyi, 2004). This is an important step towards the mainstreaming of participatory methods at national policy level.

In 2006, the Chinese government released its first major document of the year calling for the construction of a 'new socialist countryside' as the foremost task facing China in the period 2006-2010. The aim of this policy is to increase farmers' income, improve public services in rural areas, accelerate the democratization process, and promote environment protection. Very recently, the Chinese government has attempted to involve NGOs and other social originations in environmental protection and poverty reduction. International NGOs and donor agencies such Greenpeace, WWF, World Bank, Asian Development Bank and IDRC have invested major efforts in further stimulating the movement of sustainable development in China. Civil society's contribution to this movement is being expressed in China, including the rise of environmentally-oriented government-organized 'NGOs', such as the Beijing Environmental Protection Organization, and the China Environment Fund, which are playing an increasingly important role in environmental governance in China today (Mol, 2006). It seems that the core elements of the GAAS team's CBNRM efforts are now being integrated in ever more initiatives across the country, at least, on paper.

From the above paragraphs it is clear that some as yet incomplete shifts in China's development strategy are occurring: from centralized planning to decentralized planning, from government dominated directives to multi-stakeholder participation, from economic prioritisation to a more balanced and people-centred development perspective. The central government report of 2007 states that, "... We must put people first, promote faster progress in social programs, work energetically to solve the most practical problems that are of greatest concern to the people and most directly affect their interests, safeguard social fairness and justice, and ensure that all of the people share in the fruits of reform and development." These shifts would allow and promote a stronger and wider adoption of a CBNRM approach in China.

9.2.3 Strengths, weaknesses, opportunities, and threats to CBNRM

It is a central assumption of this thesis that CBNRM is a promising approach to addressing the issues of natural resource degradation highlighted above. But I want to point out here that CBNRM is certainly not a panacea to deal with all environmental concerns. Like any other approach, it has its potentials and limitations. Critical analysis of its potentials and limitations can contribute to its appropriate application in policy and action. Based on the findings of this study, I therefore summarise here the strengths, weaknesses, opportunities and threats (SWOT) of CBNRM.

A SWOT analysis of the application of CBNRM in Guizhou shows that the main strengths are its ability to address poor resource users' needs and interests through support to their active participation in decision-making and action, enhancing collective action, empowering marginalized people, building local level social and institutional capacity, promoting community institutions, and improving the livelihoods of the rural poor. CBNRM is also an organic and holistic approach that allows learning to happen and is flexible enough to be adapted to differences in context. The main weaknesses revealed by analysis of the material in this thesis are that it requires certain skills (such as facilitation), considerable time inputs in coordination, and good local leadership, and it has difficulty in addressing cross community or cross institutional scale environmental issues. The research however also shows strong opportunities at local levels for successful CBNRM The 'opportunity space' for CBNRM has been widened since the GAAS team began its work by the recent openness of central government policies to more bottom-up decision making processes and rural democracy as ways for building a harmonious society, the decentralization of property rights for natural resources, and the growth of civil society in China. But the research findings presented in this thesis also demonstrate that unbalanced power relations among stakeholders, the current bureaucratic and administrative structure, and the lack of downward accountability mechanisms, fierce market forces and decreased trust among villagers pose strong actual or potential threats to CBNRM practice and further expansion.

The social actors and stakeholders identified tend to respond to economic drivers or to making trade-offs that safeguard or promote their individual position- a rational move from their perspectives. CBNRM attempts to bring into being new forms of

governance that seek a more sustainable balancing of interests rather than by finding solutions through (economic) trade-offs. The opportunity to do so is opening up but caution is needed to manage expectations and not to entangle vulnerable (because relatively powerless) local people in a power struggle with higher-level authorities or to open up divisions within local communities. If a more sustainable balance is to be achieved then there is a need to invest also in efforts such as training in facilitation; recognition of the positive role of farmers' organisations in civil society development, and sustainable market-oriented enterprise development under community control.

9.3 Final thoughts

This thesis documents and analyses the introduction in China of the concept of CBNRM. Practising CBNRM has been a challenging journey for the GAAS team. CBNRM involves much learning by doing. CBNRM itself is not a fixed model or a set of guidelines, it more likely an evolving or moving target. The team has learned that successful CBNRM practice must be sensitive and responsive to local physical, socio-cultural, and economic conditions. Thus it is impossible to determine beforehand a detailed course of action, and the outcomes are not always predictable or as expected. Regular group reflections and peer learning activities have become the GAAS team's routine activities. The team started the journey by trying to understand what CBNRM was about and how the concept of community-based natural resource management might be translated into practice.

We then analysed what elements made CBNRM work and what constraints limited its potential; we did this through action research together with other partners. Equipped with new understanding, the team stepped further on its journey by attempting to scale up CBNRM and to explore supportive policies and institutional environments for institutionalizing CBNRM in Guizhou and beyond. In the course of its journey the team has played multiple roles, going far beyond the 'simple', traditional role of researcher who only needs to care about how many publications have been produced. In many ways, the team played the role of mobiliser, organizer, trainer, facilitator, coordinator, mentor, advocator, or even village leaders' assistant. Among these roles, the most challenging one has been to engage many actors with divergent interests in a process of learning, decision-making and taking concerted actions for sustainable natural resource management. To do so, required not only new skills, experience and patience, but also that the team members maintained a strong and enduring commitment to rural development, a strong sense of social responsibility, and the courage to speak out.

The evidence of this thesis is that the team did well in several respects. First, the team profoundly changed their attitudes and working methods from 'teaching farmers what to do' to 'learning with farmers together'. They developed the skills and attitudes necessary to understand farmers' interests and perceptions, respected local

knowledge, and committed themselves to improve rural poor people's lives.
Second, the team learned to start their work from an informed understanding of farmers' urgent but common concerns in the community, and by engaging farmers in discussing how to address these concerns. The discussion processes mobilized farmers to care about their common concerns. Community members' active involvement in action planning increased their interest in taking responsibility to do something better for the community and themselves. Their first steps in collective activities increased mutual trust, built individual and social capacity and fostered confidence in their own knowledge and skills.
Third, community institutional development has been highlighted by the GAAS team's CBNRM initiative (Sun & Zhou, 2002). In Kaizuo township, the villages covered by the project have set up community-based management mechanisms for potable drinking water systems and for small-scale irrigation systems. Most of these institutions work very well in terms of effective water supply, good maintenance of the water systems, efficient use of water resources, and equal distribution of water, and fairness in water fee collection. These drinking water management institutions have been introduced by the township government and the Hydrology Bureau to the whole township and to the other places in Changshun county. The method has been also adopted by other villages through cross farm visits and through visits made to relatives in Kaizuo (Sun & Chen, 2001). Local institutions for forest and grasslands (e.g., Dabuyang) have been developed. In some cases these have performed well, but some do not. The factors affecting their performance for the first time have been documented.
Fourth, the GAAS team generated rich experiences and lessons for CBNRM scaling up from the day-to-day and face-to-face interactions and cooperation with local farmers, township government and line ministries. The team members intensively worked at the project site. We feel that Kaizuo has become our second home, and the local people consider that we are part of Kaizuo. Sharing everyday life with villagers, and being fully involved in their struggles, is essential for understanding what rural development is all about and can never replace learning from a book. This is an important lesson for all rural development researchers and scholars, and hopefully, will resonate with decision-makers in the country's science and technology and higher education systems.
On this journey the GAAS team also harvested many painful lessons. Their initial ignorance of intra-community divergence and the lack of sufficient sensitivity toward social and gender issues caused trouble for the communities, at times increased inequity between community members, and also sometimes created conflicts in the community. Often the most affected and harmed were the poorest and the women. The cases of the Xiaozhai mill house and the Animal Bank of Niuanyun illustrate that CBNRM bad practice can cause harm. Hence, we have learned that it is important to keep the following questions in mind when one promotes CBNRM: Whose project? For whom? Who benefits (more) and who loses (more)? This thesis suggests that more and better analysis of the group dynamics surrounding collecti-

ve action is very much needed; otherwise, our good intentions may result in more inequity.

The difficulty of identifying and balancing the negotiable and non-negotiable components and principles to guide the team in its relationship with the local government and line ministries made the team think hard, to decide what, how and when to compromise and accommodate their interests, or to stick to CBNRM principles. The confusion brought about by reflecting on this key question led to difficult situations in our partnership building. Even though the GAAS team members often and regularly reflected on 'what we do well' and 'what we do wrong', the systematic assessment of the team's learning and performance proved insufficient.

We see that we can improve our work in several ways. More attention needs to be given to social and gender issues in natural resource management. As the case of goat raising and our earlier experience in water and soil erosion control (see Chapter 2) show, technologies have strong social effects in shaping and reshaping relationships between people and also on the relationships between natural resources and people. Careful analysis of the social aspects of resource management interventions would reduce the risks of creating social conflicts and subsequent degradation of natural resources. The case of the Xiaozhai mill house was a particularly painful experience.

The team has realised that scaling up needs to be pursued more strategically. It is significant to understand the township leaders' motivations based on the reward and promotion system for staff at this level. While Kaizou leaders may appreciate CBNRM per se, they are nevertheless subject to directives that emanate from higher levels. The resulting tensions are compounded by the fact that Kaizou leaders have little authority and resources at their disposal. It may be possible to elicit greater support from the township leaders if they perceive the project to be instrumental in achieving their own goals - i.e., to obtain recognition by higher authorities and promotion. To some extent, the CBNRM project did play a skilful strategic hand. But it has had to confront the issues of how much compromise or accommodation we are willing to condone, what concessions we are getting in return and what elements of the project we consider should not be compromised. For instance, following the propensity of local leaders to establish models or showcases that can be displayed to visiting high-ranking officials, a township leader has chosen to invest a great deal of resources in one village, including funds from the CBNRM that he has offered as small grants (see the Animal Bank of Niuanyun and Jichang cases in Chapter 8). While the leader has achieved modest recognition for the improvements in the village, the situation raises issues on the efficient use and equitable distribution of resources. As a result of the apparent 'misuse' of decision-making authority vested by the CBNRM project, additional precautions should be installed in project management. For example, villager representatives could be put onto the small grants management committee.

Strengthening villagers' capacity to become involved in public affairs that affect their lives without corresponding establishment of venues for expression and adjust-

ments in government procedures and priorities often renders the villagers vulnerable (see the cases of the Kaizuopu fruit tree planting project and the Chaobai tap water system project). The GAAS team should develop the team members' capacity in vulnerability analysis, conflict management and negotiation skills for more effective scaling up, strengthening platform building to open venues for dialogue and communication between villagers and the government officials, and advocating adjustments in government procedures and priorities that would be more people-centred and bottom-up.

In sum, the GAAS team's more than ten years of experience provides a unique case that forms the basis for this study. But I want to stress that this PhD research forms just a part of the GAAS team's learning activities. As mentioned in Chapter 4, the team's relative neglect of effort to develop an appropriate theoretical framework to analyze its work has been one of the weaknesses of the team's effort. Most of the reports and articles prepared by the team have been limited to describing 'what happened', and discussed little about 'how and why it happened'. Without theoretical argument, the value of our work could be discounted in both the academic sense and as policy advocacy. I believe this PhD research will 'correct' this situation. Moreover, the research findings through this thesis now can be shared with other researchers and stakeholders, namely the farmers, township and county officials, and others interested (when translated into Chinese). Such sharing will foster further reflection and learning by all the people involved in the CBNRM initiatives in Kaizuo, Changshun county of Guizhou province.

9.4 Further study

At the end of the thesis, I would like to propose several issues for further consideration:

(1) This thesis has pointed out that collective efforts of learning through interaction among stakeholders are fundamental for successful CBNRM or sustainable natural resource management, but concerted actions of multiple stakeholders can hardly be achieved unless the bureaucratic orientation and institutional structure has changed. Effecting these changes would not be an easy task. We need to understand exactly what changes are needed and what the appropriate strategies for bringing them about.

(2) Unregulated market forces are becoming greater threats to sustainable resource management. How could community institutions cope with the growing market demands for their resources?

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Annexes

Annex A
Assessment of village performance based on farmer-established criteria for year 2000 (average scores of 33 participants)

Criteria	*Chaoshan*	*Guntang*	*Dabuyang*	*Niuanyin*	*Dongkou*	*Xiaozhai*
Local rules and enforcement	9.0	8.0	8.0	8.5	9.5	7.0
Organization of villagers	9.5	8.0	8.5	9.0	9.5	8.0
No. of projects and effectiveness	9.5	7.5	10	8.5	10	9.0
Unity of villagers	9.0	8.0	7.5	9.0	9.5	8.0
Skills gained	9.5	8.0	9.5	8.5	9.0	8.0
Women's participation	10	8.5	10	9.0	8.5	8.0
Total average score	56.5	48.0	53.5	52.5	56.0	48.0
Ranking	1	5	3	4	2	5

Note: 1-5 poor, 6-7.5 fair, 8-9 good, and 9.5-10 very good (Source: Vernooy, et al., 2003: 128)

Annex B
Summary of group discussion notes for Jitian and Kaizuochang villages

Location: Jitian Village of Kaizuo Township
Date: June 6, 2006
Participants: two village leaders, 7 male farmers and 3 female farmers

Jitian has 710 mu forest and 870 mu grassland on hills and mountains. Jitian has two forms of forest management: collectively managed forests and household contracted forests. The collective forests are mostly the holy forests of the village. Jitian village has a set of rules to control illegal tree cutting and firewood collection from the collectively managed forests. Tree cutting from the collective forests for personal purposes are not allowed. Only the dead wood can be collected for firewood. The villagers are allowed to collect non-timber products without harming the forests. The household contracted forests are individually managed by village households. The farmers can cut trees for household consumption from their own contracted forests as long as they get permission from the township forest station. The contracted forests are mostly reforested in 1980s-1990s. The village leaders organized the villagers in January of 2006 to make rules for forest management and animal grazing. The rules for forest management focused on preventing stealing, illegal cutting and forest fire. The rules for animal grazing mainly focused on preventing animals eating crops.
Jitian has totally about 120 animal herds, mostly buffalo and some cattle. There is no management for grasslands. According to the farmers, their grassland has enough grass for their animals. The villages surround Jitian have also plenty of grasslands, so Jitian villagers have no conflict with other villages and open their grasslands to all. The participants mentioned that in 2001 the township forestry station hired people to plant trees on their grasslands. But the villagers did not care for the planted trees, and never stopped grazing animals on the afforested grasslands. The forestry station did not have enough manpower to prevent farmers from grazing their animals. Very few trees survived on Jitian's grasslands. Farmers argued they understood the forestry station had the task of planting trees each year, but they had grazed their animals there for decades. If all the hills had been planted with trees, where would they graze animals? When the trees were just planted, they had to graze their animals on the grasslands that were close to their crop fields, and the animals often went to the fields eating crops. This caused lots of conflicts between villagers. The participants also recalled a big forest fire that occurred five years ago and started from the township forest farm that neighbours Jitian's forest. That fire burn almost 50% of Jitian's forest.
There are three small mountain ponds in the village, which were built in 1964 by the villagers for irrigation purposes. The ponds are collectively owned and everybody in the village can pump the water for irrigation freely. Most of the households in Jitian have a small water pump. However, the water from the ponds is only enough

for rice-seedling fields of the village in the dry season. So the village set a rule that the households who irrigated rice-seedling fields had priority to pump the water over the households who irrigate other fields. Each year before the raining season each household contributes one worker to repair the ponds if needed and to clear water channels. But the participants mentioned that in recent years, especially in 2006, the water was not even sufficient for the rice-seedling fields because of drought. Two spring wells in the village provide the drinking water. The villagers clean the wells once a year.
Generally the participants were satisfied with the management of their forest and water systems. They argued that the forest fire that happened five years ago was out of their control. They remarked that if their grasslands were not afforested they would have enough grassland for their animals. For them, open to the access to grassland was not a really problem so far.

Location: Kaizuochang Village of Kaizuo Township
Date: June 3, 2006
Participants: two village leaders, 8 male farmers and 2 female farmers

Kaizuochang has 940 mu forestland and 190 mu grassland. All the forestlands of Kaizuochang had been contracted to individual households soon after the Household Contract Responsibility System had been enacted in 1982. According to the participants, the farmers cut (or stole) trees from each other's forestlands. Few years later there were almost no useful trees left in the forests. Then the forestlands became 'wastelands' and open to all. In 2001 the Forestry Station reforested the 'wastelands', but there are no trees to be found there now. The participants said that no one in the village took care of the trees and farmers grazed cattle and buffaloes on the reforested lands. Grasslands had been open accessed in Kaizuchang. In recent three years some of their grasslands were contracted to private people for digging clay. In 2006, about 1000 mu wasteland including the grassland of the village were terraced by the Land Administrative Bureau. Farmers could hardly find a place to graze their animals. About 40 cattle/buffaloes in Kaizuochang were sold in 2006. With subsidy from the government specially for small farming machineries, more than 30 households sold their cattle or buffaloes and purchased ploughing machines. However, farmers now found they were short of manure for their fields.
There was a tap drinking water system in the village and the water source was from the Huangjiazhai reservoir. After the water was polluted by the fish farm, the farmers stopped using the water and since then the tap water system has no longer been managed. In 2005 the iron factory occupied some of Kaizuochang's land, so the factory built another tap drinking water system for the village as compensation for the land occupation. The water source was a mountain spring. Learning from the CBNRM project targeted villages; the Kaizuochang villagers installed a water meter for each household and collect water fees to cover the expenses for electricity, mana-

ger's wage and maintenance. However, the village is facing problems in collecting water fees. The water manager (one of the male participants) said that he did not want to manage the water system anymore because of the difficulty in water fee collection, which was the reason the former two water managers had resigned since the tap water system had been built one year ago. This third water manager had stopped the water supply for two times already. By means of stopping water supply, he wanted to pressure the villagers to submit water fee. But the manager's behaviour annoyed the farmers.

Generally, the participants were not satisfied with the management of forests, grasslands, and the tap drinking water system in their village.

Annex C

Interview questions

(1) If giving 0 to no and 10 to absolute availability, how much do you give to 'arable land', 'forest', 'grassland' and 'water resources' for year 1995 and 2006 respectively? What are the reasons for the different scores for 1995 and 2006?

(2) If giving 0 to never have, and 10 to always have to 'mutual help', 'network', 'trust', and 'collective activity' for year 1995 and 2006 respectively? What are the reasons for the different scores for 1995 and 2006?

(3) If giving 0 to no and 10 to absolute availability, how much do you give to 'health', 'education', 'technical skills of family members' and 'labour in the family' for year 1995 and 2006 respectively? What are the reasons for the different scores for 1995 and 2006?

(4) If giving 0 to no and 10 to absolute availability, how much do you give to 'cash', 'loan or credit', 'saving' and 'stored grain and livestock' for year 1995 and 2006 respectively? What are the reasons for the different scores for 1995 and 2006?

(5) If giving 0 to no and 10 to absolute availability, how much do you give to 'road', 'house', 'facilities of drinking water and irrigation', 'production tools', 'fuel energy', 'market' and 'communication like post mail, telephone, television' for year 1995 and 2006 respectively? What are the reasons for the different scores for 1995 and 2006?

Annex D

Questionnaire

Village _____ Name _____ Data_____

Sex _____ Age _____

		Arable land		*Forest*		*Grassland*		*Water resource*
Natural capital								
1995	Score							
	Reasons							
2006	Score							
	Reasons							
Social capital		Mutual help		Network		Trust		Collective activity
1995	Score							
	Reasons							
2006	Score							
	Reasons							
Human capital		Health		Education		Skills		Labour
1995	Score							
	Reasons							
2006	Score							
	Reasons							
Financial capital		Cash		Loan or credit		Saving		Grain and livestock
1995	Score							
	Reasons							
2006	Score							
	Reasons							
Physical capital		Road	House	Water Facilities	Tools	Fuel Energy	Market	Communication
1995	Score							
2006	Reasons							
	Score							
	Reasons							

Summary

Environmental degradation and rural poverty are inter-related problems of great concern to developing countries. The poor mostly live in environmentally fragile regions and rely heavily on natural resources for their livelihood subsistence. Unfortunately, environmental degradation and rural poverty are often addressed separately or in terms of a zero sum equation: either the choice is protecting the environment through limiting access of rural people to the natural resources, or improving people's livelihood and promoting economic growth by over exploitation of natural resources. It seems an unresolvable dilemma in developing countries.

In the late 1970s, China started its economic reform, transforming a centrally planned economy to a market-oriented one. As a result, the so-called Household Contract Responsibility System (HCRS) replaced the commune system in rural China. The rationale behind the HCRS is to promote farmers' incentives in agricultural production through privatising the use right of the collectively owned lands to individual farm households. Empirical evidence shows that, since the introduction of this new system, the rural economy in general has improved in many places, but forests, grasslands and water resources have rapidly been degraded. The underlying cause of this has been the shift to open resource access.

A contemporary debate rooted in the new institutional thinking argues that neither state control nor market instruments are able to solely solve environmental problems. In order to achieve sustainable development, it is necessary to look for alternative approaches or 'the third way'. The new institutional scholars assume that common property regimes could be a solution, with a set of carefully designed institutions that can control people's self-interest and encourage group interests in natural resource use and management for pursuing their livelihoods. Other theoretical perspectives, with a focus on participatory development and social learning share a common interest in collective action. Communication, trust, the anticipation of future interactions, and ability to make binding agreements among group resource users can promote collective action in natural resource management for sustainable livelihood. These theoretical bodies have led to the emergence of an approach known as Community-Based Natural Resource Management (CBNRM). CBNRM integrates concerns of sustainable resource management and people's livelihood improvement, advocates (the revival of) common property regimes, emphasizes community-based institutions for collective actions, promotes participation of local resource users in decision-making, and enhances people's capacities.

Community-Based Natural Resource Management (CBNRM) was introduced in China by international donors in the 1990s as a promising solution to addressing natural resource degradation and livelihood improvement of rural people. With support from the International Development Research Centre (IDRC) of Canada, a research team from the Guizhou Academy of Agricultural Sciences (GAAS) has carried out CBNRM action research in rural Guizhou, a poor province in South-western China, since 1995.

This PhD study takes the GAAS-led CBNRM initiative in Kaizuo township, Changhsun county as its research 'object' to analyse whether and how a CBNRM approach contributes to sustainable natural resource management and livelihood improvement of the rural poor. The issues pursued in this thesis are: How does CBNRM work and why? What are the outcomes and why? What are the strengths, weaknesses, opportunities and threats of CBNRM in a country such as China with its rapid economic development and socio-political transformation? What are the policy implications in relation to China's increasing resource degradation and environmental management problems?

Chapter 1 introduces the context of problems related to natural resource management in China and the Chinese government's efforts to address these problems. The rapid economic transformation and new resource property regime clearly have an impact on sustainable natural resource management. The impact brought about an attempt of rebuilding common property management to address environmental issues.

Chapter 2 offers a historic review of China's land reform over the last 50 years, and reveals how the shifts in resource property regime affect the way local people manage natural resources. It argues that property right arrangements determine people's behaviour and practice in natural resource use and management. It concludes that the HCRS fails to promote sustainable management of forest, grassland and water resources.

Chapter 3 outlines the analytical framework based on the theoretical debates. The analytical framework discusses how community-based institution can contribute to sustainable, equitable and effective management of common-pool resources and livelihood improvement of rural poor people. It then further discusses how the effects of the community-based institutions can be affected by both internal and external factors. This chapter also argues the roles and value of a change agency in facilitation for collective action in natural resource management.

Chapter 4 presents the methodology used in this research, including research strategies and the methods used for data generation and analysis. This study applied a methodology made up of a combination of anthropological and sociological methods, and some tools from ecology, applying a long-term perspective, and relying on a long-term, direct and personal involvement.

Chapter 5 uses a stakeholder analysis approach to explore the interests of the different stakeholders and analyses the dynamic of their relationships as they pursue their stake-holding in natural resources. It demonstrates that the process of economic transformation and development has increased the severity of struggles for access to and control over natural resources. It argues that uncontrolled competing claims by different stakeholders with diverse interests cause social conflicts and damages to the natural resources, and suggests that concerted actions among stakeholders are needed to address the resource dilemma.

Chapter 6 presents an in-depth case study in one village called Dabuyang. The case study explores how CBNRM was understood and practised in a rural community of

China, with the focus on the process and outcomes of the GAAS team facilitation efforts in farmer organization, village-based institution development, and capacity building as means to promote collective action in natural resource management. The case study reveals that village-based institutions have played a central role in achieving sustainable, equitable and effective natural resource management. However, the Dabuyang case also shows that the performance of these local institutions is affected by internal factors, such as village leadership and farmers' capacity to cope with changes, and challenged by external factors, such as market forces and some development initiatives.

Chapter 7 examines the impacts of the GAAS team-led CBNRM action research on natural resource management and livelihood improvement of farmers through a set of comparative studies and an ecological survey. This study compares between: (1) villages with successful and less successful CBNRM intervention in Kaizuo township regarding changes in the five capital assets (natural, social, human, financial and physical) from 1995 to 2006; (2) between villages in Kaizuo township and another township called Malu regarding resource management institutions for forest, water systems, and grassland; (3) the year of 1995 and 2006 regarding changes in vegetation status two villages Dabuyang and Xiaozhai, which have been involved in CBNRM research since 1995. The comparative studies made plausible that CBNRM action research has positive impact on livelihood improvement of the rural farmers, development of local resource management institutions and improvement of forests and grasslands.

Chapter 8 explores the GAAS team's horizontal and vertical scaling-up strategies and processes to expand the impact of the CBNRM action research by working with the Kaizuo township government and four line ministries of Changshun county. The case of cooperation with the Forestry Bureau shows that integrating CBNRM principles into government programmes is possible, as long as there is a need or desire to work with farmers. The case of the Animal Bank argues that CBNRM innovation can not be replicated or transplanted in a different local context without adaptation. Local leadership, village politics and the social structure and culture of community all shape CBNRM outcomes. This case also reveals that the township government plays a crucial role in CBNRM scaling up. However, this role is strongly influenced by financial pressure (generating income) and by criteria of government performance evaluation (which stress upward accountability). The examples of cooperation with the Agricultural Office, Bureau of Water Resource Management and Bureau of Animal Husbandry illustrate the difficulties that GAAS team faced in terms of decision-making processes, current bureaucratic and administrative structures, and the lack of downward accountability mechanisms.

Chapter 9 presents the major findings and conclusions of the study. Evidence examined in this thesis has shown that the CBNRM approach has effectively contributed to sustainable management of natural resources and livelihood improvement of the rural people in Guizhou. The strengthened or newly developed community institutions play a crucial role in effective and equable management of collectively owned

forests, grasslands and water resources. However, the performance of these community institutions is affected by both internal and external factors. Although the design principles developed by New Institution scholars are valuable, they have proven to be too simplistic to apply wholeheartedly in different contexts, due to a narrow focus on the internal factors and ignorance of the external forces. Ignorance of the external factors and the local social-cultural settings and macro institutional, economic and political context in which they are embedded, leads to failure in community institutional development.

CBNRM is not a panacea to deal with all environmental issues. The complexity and uncertainty of natural resource management is ever increasing, and this implies a real challenge for community institutions. A CBNRM approach has an eye for this challenge, but has a limited capacity to address (larger) cross-scale environmental issues that involve multiple stakeholders with diverse interests in natural resources. The GAAS team's facilitation efforts have been critical in the success of CBNRM practice and CBNRM scaling up. However, the empirical materials of this study also reveal that their facilitation does not always produce positive outcomes, and the effects of facilitation are limited by unbalanced power relations among stakeholders.

Samenvatting

Ontwikkelingslanden zijn zeer bezorgd over milieu-degradatie en rurale armoede, twee problemen die nauw met elkaar verbonden zijn. Armoede is geconcentreerd in fragiele eko-systemen waar de bevolking grotendeels afhankelijk is van natuurlijke hulpbronnen voor de produktie van basis-voorzieningen en voor overleving. Helaas worden milieu-degradatie en rurale armoede vaak ofwel als twee onafhankelijke problemen, ofwel als twee volledig tegenstrijdige problemen gezien. Beleids keuzes worden aldus voorgesteld als milieu-bescherming via restriktie van de toegang tot natuurlijke hulpbronnen of ekonomische ontwikkeling via over-exploitatie van de bronnen. Een middenweg schijnt er niet te zijn.

Met het oog om een centraal geplande ekonomie te veranderen in een marktgestuurde, begon China tegen het einde van de jaren zeventig een ekonomisch hervormings-process. Een van de belangrijkste beleidsmiddelen was de introduktie van het zogeheten Huishoud-Kontrakt-Verantwoordelijkheids Systeem (HCRS) in de rurale gebieden. Het doel van de HCRS is om boeren huishoudens aan te moedigen om meer en beter te produceren middels de privatisering van de land gebruiks-rechten die voorheen in handen waren van de produktie-kollektieven. Onderzoek toont aan dat sinds de introduktie van dit nieuwe systeem de rurale ekonomie in vele regios verbeterd is, maar dat tegelijkertijd graslanden, bossen en waterbronnen er in kwaliteit en kwantiteit op achteruit zijn gegaan. De voornaamste oorzaak hiervan is dat toegang tot deze hulpbronnen nu voor iedereen vrij is.

Recente theoretische bijdragen aan het milieu/ontwikkelings debat zijn gemaakt door de 'Nieuwe Institutionele' denkers. Ze argumenteren dat noch de staat noch de markt alleen een oplossing kan bieden om milieu-dregradatie aan te pakken. Duurzame ontwikkeling vereist een alternatieve benadering, die soms de 'derde weg' genoemd wordt. 'Nieuwe Institutionele' denkers benadrukken dat systemen gebaseerd op gemeenschappelijk-beheerd eigendom (common property) een oplossing kunnen bieden voor effektief beheer en gebruik van natuurlijke bronnen, met als voorwaarde dat er duidelijke (spel)regels ontworpen worden om eigenbelangen te kontrolen en groeps-belangen te bevorderen. Andere theoretische benaderingen, met een oog voor participatieve ontwikkeling en social learning, richten de aandacht ook op gezamelijke aktie. Kommunikatie, (het opbouwen van) vertrouwen, vooruit denken, en de bereidheid om wederzijds-bindende afspraken te maken, zijn de elementen die kunnen bijdragen aan effektieve, gezamelijke aktie voor duurzaam natuurbehoud én ekonomishe ontwikkeling.

Deze verschillende theoretische perspektieven stonden aan de wieg van een benadering die bekend is geworden als community-based natural resource management (CBNRM), oftewel het beheer van natuurlijke bronnen bebaseerd op samenwerking op lokaal niveau. CBNRM is gebaseerd op een aktie-georienteerde filosofie, integreert aandacht voor duurzame milieu ontwikkeling en ekonomische verbetering, promoveert participatie en vernieuwde kollektieve beheers-systemen, en benadrukt lokale institutionele ontwikkeling (vooral gericht op gezamelijke aktie). Een aantal

internationale donor-organisaties introduceerden CBNRM in China in de jaren negentig, als een alternatief om de milieu en rurale ontwikkelings-problemen aan te pakken. Een onderzoeks-team van de Guizhou Academy of Agricultural Sciences (GAAS), met behulp van financiële en technische steun van het Canadese International Development Research Centre (IDRC), pioneerde CBNRM in 1995 in de zuid-westelijke (en zeer verarmde) provincie Guizhou.
Deze doktoraal studie heeft als onderzoeks-'object' dit door het GAAS-team uitgevoerde CBNRM werk in Kaizuo township (een rurale Chinese administratieve eenheid die bestaat uit verschillende dorpen en gehuchten). Het onderzoeks-vraagstuk is of en op welke wijze een CBNRM benadering bijdraagt aan duurzame ontwikkeling en aan de verbetering van de levensomstandighden van de arme rurale bevolking. Specifieke vragen zijn: Hoe opereert CBNRM in de praktijk? Wat zijn de resultaten? Wat zijn mogelijke verklaringen voor praktische, suksesvolle CBNRM voorbeelden? Wat zijn de sterke en zwakke kanten van een CBNRM benadering in een land zoals China dat momenteel zeer snelle ekonomische en social-politieke veranderingen ondergaat? Wat zijn de beleids-gevolgen met betrekking tot het stimuleren van een CBNRM benadering op het gebied van milieu en rurale ontwikkeling?
Hoofdstuk 1 beschrijft de milieu en rurale ontwikkelings-problemen waar China vandaag de dag voor staat en de wijze waarop de Chinese overheid deze probeert aan te pakken. De zeer snelle ekonomische transformatie en het nieuw ingevoerde eigendoms-systeem hebben duidelijke invloed of het duurzame beheer van natuurlijke hulpbronnen en milieu. De negatieve gevolgen hebben aanleiding gegeven tot het hernieuwen van en experimenteren met kollektieve eigendom beheers-vormen.
Hoofdstuk 2 geeft een historisch overzicht van China's land-hervormings process gedurende de laatste 50 jaar. Dit overzicht maakt duidelijk dat iedere verandering in het eigendom beheers-systeem direkte invloed heeft (gehad) op lokale beheers-vormen van natuur en milieu. De belangrijkste konklusie in dit hoofdstuk is dat het Huishoud-Kontrakt-Verantwoordelijkheids Systeem (HCRS) niet bijdraagt aan duurzaam beheer van natuur en milieu in de rurale gebieden.
Hoofdstuk 3 behandelt een aantal relevante theoretische debatten en presenteert het analytische kader voor de studie. Centraal staat lokale institutionele ontwikkeling (vooral gericht op gezamelijke aktie) dat wordt gezien als een effektief middel om tot zowel duurzaam natuur en milieu beheer te komen én rurale armoede te bestrijden. Het hoofdstuk geeft ook een beschrijving van interne en externe faktoren die de vormen en uitkomsten van het beheer van natuurlijke bronnen bebaseerd op samenwerking op lokaal niveau beheer beinvloeden. De belangrijke, faciliterende rol die door change agents gespeeld kan worden, wordt ook besproken.
Hoofdstuk 4 beschrijft de onderzoeks-metodologie. Het intensieve veld-onderzoek is gebaseerd op een kombinatie van sociologische en antropologische metoden, een historisch perspektief, en aangevuld met enkele ekologische technieken.
Hoofdstuk 5 maakt gebruik van een dinamieke stakeholder analyse om de (soms veranderende) belangen van de versheidene sociale aktoren boven tafel te krijgen met betrekking to natuur en milieu beheer. Het veld-onderzoek laat er geen twijfel

over bestaan dat de recente ekonomische veranderingen hebben geleid tot de intensifikatie van toegangs- en gebruiks-disputen met betrekking tot de natuurlijke hulpbronnen. Het hoofdstuk beargumenteert dat deze ongekontroleerde disputen, uitgevochten op lokaal niveau door boeren huishoudens, overheids-personeel, zakenlieden, en soms met inmenging van onderzoekers zoals het GAAS team, tot verdergaande natuur en milieu degradatie leiden. De enige oplossing voor dit dilemma is kollektieve aktie gebaseerd op wederzijdse instemming en duidelijke afspraken (concerted action).

Hoofdstuk 6 is een gedetailleerde case studie van het dorp Dabuyang. De case studie maakt duidelijk op welke wijze CBNRM geinterpreteerd en uitgevoerd wordt in Guizhou. Speciale aandacht wordt besteed aan het uitvoerings-proces, de resultaten, en de rol die het GAAS team speelt ten aanzien van de promotie van lokale institutionele ontwikkeling, boeren organisatie, en het versterken van beheers en andere belangrijke kapaciteiten die tot duurzame beheer kunnen leiden. De Dabuyang case studie toont aan dat CBNRM zeer effektief kan zijn, maar dat goede resultaten sterk afhankelijk zijn van interne faktoren zoals lokaal leiderschap en boeren huishoudens' opgebouwde weerstands-kapaciteit. Externe faktoren, waaronder toenemende vermarkting en ondoordachte ontwikkelings-projekten en programmas, kunnen serieuze problemen veroorzaken.

Hoofdstuk 7 geeft een kritische kijk op de rol die het GAAS team heeft gespeeld. Onder de loep komen de resultaten van het CBNRM werk door middel van een vergelijking van: 1) dorpen in Kaizuo township alwaar de resultaten positief dan wel niet zo positief waren gebaseerd op aktie onderzoek uitgevoerd tussen 1995 en 2006; 2) de vitaliteit en effektiviteit van lokale instituties met betrekking to natuur beheer in dorpen in Kaizuo township en dorpen in nabijgelegen Malu township; 3) veranderingen in vegetatie als gevolg van CBNRM interventies in twee project dorpen, nameijk Dabuyang and Xiaozhai, met 1995 als basis jaar en 2006 als vergelijkings-jaar. Deze drie soorten vergelijkingen geven aan dat CBNRM een positieve invloed heeft gehad op de verbetering van de overlevings-situatie van lokale boeren huishoudens. Daarnaast heeft het CBNRM aktie-onderzoek geleid tot de ontwikkeling van dinamieke lokale instituties en tot verbetering in het beheer van graslanden en bossen.

Hoofdstuk 8 beschrijft en analyseert de manieren waarop het GAAS team geprobeerd heeft om het aktie-onderzoek te verspreiden, zowel in geografische (scaling-out) als institutionele en organisationale (scaling-up) zin, door middel van samenwerking met de Kaizuo township overheid en met vier ministeries opererend in Changshun county (een hogere administratieve eenheid bestaande uit een aantal townships). De case studie die de samenwerking met het Bosbouw Bureau beschrijft, toont aan dat het mogelijk is om CBNRM uitgangsregels in het overheidsapparaat op te nemen onder voorwaarde dat er bereidheid is om met boeren samen te werken. De case studie die de ervaringen met de Animal Bank beschrijft, maakt duidelijk dat CBNRM innovaties niet zomaar gekopieerd kunnen worden in een ander dorp, maar dat aanpassing aan lokale social-ekonomische en politieke

omstandigheden vereist is. Lokaal leiderschap, dorps-politiek, kultuur en sociale struktuur gezamelijk beinvloeden de verspreiding van CBNRM. De Animal Bank case studie is ook een goed voorbeeld van de invloed uitgeoefend door de township overheid met betrekking to verspreiding. Townships staan onder grote druk om zelf inkomsten te verwerven (niet altijd met aandacht voor duurzame ontwikkeling), en moeten regelmatig verantwoordelijkheid afleggen aan hogere machten (wat boeren huishoudens van het beleid vinden, is niet van invloed of salarissen). De case studies van de samenwerking met het Landbouw Bureau, Water-Beleids Bureau, en Veeteelt Bureau, geven aan dat het door het GAAS team uitgevoerde 'werk' niet altijd gemakkelijk was, precies vanwege deze twee zojuist genoemde faktoren.

Hoofdstuk 9 geeft een samenvatting van de belangrijkste bevindingen en konklusies. Het veld-onderzoek levert bewijs dat CBNRM een effektieve bijdrage aan duurzame rurale ontwikkeling in Guizhou heeft geleverd. De versterkte en nieuw ontwikkelde lokale instituties staan central in een susksesvolle uitvoering van een CBNRM benadering. De resultaten worden beinvloed door zowel interne als externe faktoren. Het onderzoek leidt tot de konklusie dat, hoewel de interne faktoren opgesomd door de Nieuwe Institutionele School, van belang zijn, deze niet zomaar blindeloos toegepast kunnen worden in iedere situatie zonder een kritische kijk op externe faktoren. Macro-politieke en ekonomische condities beinvloeden de wijze waarop interne faktoren op lokaal niveau hun rol spelen. Lokale geschiedenis en kultuur zijn andere krachten die lokale institutie ontwikkeling vorm geven. Onvoldoende aandacht voor de komplexe interakties tussen deze faktoren leidt tot het falen van een CBNRM benadering.

CBNRM kan niet alle natuur en milieu problemen oplossen. Natuur en milieu beheer lijkt steeds moeilijker en onzekerder te worden. Dit vereist voortdurende aanpassing van lokale instituties. Hoewel een CBNRM benadering goede mogelijkheden biedt om op lokaal niveau resultaten te bewerkstelligen, is het moeilijker om op hogere niveaus te werken alwaar de sociale en milieu komplexiteit toenemen en belangen vaak zeer verstrengeld zijn.

De facilitatie aktiviteiten uitgevoerd door het GAAS team hebben zonder twijfel bijgedragen aan het sukses van een CBNRM benadering in Guizhou. Maar onze studie geeft ook aan dat hun team-werk niet altijd tot suksessen heeft geleid. Faciliteren is een politiek process: dit betekent dat onevenwichtige machstverhoudingen zoals die nu in China uitspelen soms 'in de weg staan'.

About the author

Qiu Sun was born on 9th November 1962 in Sichuan, China. She obtained her BSc degree in agriculture from Guizhou University in 1983. Since then she has been a researcher of Guizhou Academy of Agricultural Sciences, engaging in number of research projects or programmes on agricultural development and natural resource management in rural Guizhou. These programmes aimed to improve agricultural production through advanced technologies. However, years of working experience in rural areas made her realize that agricultural development and natural resource management were not only a matter of technology but also of the socio-cultural and economic context in which the technologies were applied and the technology users worked. Therefore, she started her master study in social development in 1998, with the scholarship from Ford Foundation. She obtained her MSc degree in 2000 from Ateneo De Manila University in the Philippines. Since 2003 she has worked on this PhD study with scholarship from International Development Research Centre.

Qiu Sun now is the director of the Integrated Rural Development Institute, Guizhou Academy of Agricultural Sciences. She is also an associate professor of Guizhou College of Finance and Economics. She is the team leader of several projects, including the IDRC-funded project 'Promotion of Sustainable Rural Development by Scaling up Community-Based Natural Resource Management (CBNRM)'. For more than 10 years she has been engaged in CBNRM practice and CBNRM scaling up in poor rural areas of Guizhou Province.

CERES PhD Education Statement Form

Completed Training and Supervision Plan Q. Sun

Description	*Department/Institute*	*Month/year*	*Credits*
I. Orientation			
Literature review and proposal writing	Wageningen University	Oct 03 - June 04	4
Presentation of research proposal	Wageningen University	16 June 04	1
II. Research Methods and Techniques			
Learning in PAU: Link Participation with Personal Development - Competence Development in Participatory Approach and Up-scaling	Baarlo, The Netherlands	1-4 Nov 03	1
Research Methodology: Designing and Conducting a PhD Research Project	Mansholt Graduate School, Wageningen	19 March - 23 April 2004	2
A practical course on the Methodology of Fieldwork	CERES, Utrecht University	7-11 June 2004	2
Social Analysis and Gender Analysis Approach in Natural Resource Management	Chinese Academy of Sciences	29-30 Sept 2005 and 11-12 May 2006	2
III Seminar Presentations			
'Scaling up Community-based Natural Resource Management (CBNRM) in China'	Guizhou Academy of Agricultural Sciences	2 August 2005	4
'Indigenous Knowledge in Natural Resource Management'	Guizhou Academy of Agricultural Sciences	6 October 2005	1
'Collective Learning in Community-based Natural Resource Management (CBNRM)'	Chinese Agricultural University	November 2005	1
'Issues on Community-based Natural Resource Management (CBNRM)'	Guizhou Technology and Sciences Commission	22 May 2006	1
'Participatory Approach to Rural Development and Natural Resource Management'	Partnerships for Community Development (PCD), Hong Kong/ Guizhou Academy of Agricultural Sciences	15-17 July 2004	2
'Participatory Monitoring and Evaluation in Rural Development Projects'	Partnership for Community Development (PCD), Hong Kong/Guizhou Academy of Agricultural Sciences	22-24 March 2005	2
'Making Community-based Natural Resource Management (CBNRM) Work in China'	CERES seminar, Wageningen University	25 May 2007	1
'Scaling up Community-based Natural Resource Management (CBNRM): collaborative learning confronts institutional politics'	Presented at 14th Int. Conf. on Multi-Organizational Partnerships, Alliances and Networks Leuven (Belgium)	28-29 June 2007	1
IV. Academic skills			
Scientific Writing	WGS, Wageningen University	1 Febuary-22	2
Techniques for Writing and Presenting a Scientific Paper	WGS, Wageningen	March 2007 20-23 February 07	1
Working with Endnote 9	Wageningen UR library	9 May 2007	1
Total			29