

**LOCAL INSTITUTIONS IN COMMON PROPERTY RESOURCES:
A Case Study of Community-Based Watershed Management
in Northern Thailand**

by

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ABSTRACT

The influence of the Tragedy of the Commons (Hardin, 1968) polarizes policy on common property resources into bimodal prescriptions - the state on the one hand and the market on the other. This study of community-based watershed management (CBWM) in Northern Thailand examines local institutions as an alternative to solve free rider problems in the commons. Four different communities - Ban Luang, Silalaeng, Thung Khao Hang, and Ban Pae - were selected for study. Field data was collected by participant observation, interview, and household survey.

It was found that community-based watershed management originated from the need for water of the lowland rice farmers. This dependence on watersheds for a sustainable livelihood brought the peasants together to form CBWM institutions to regulate joint use, sustain yields, and exclude non-members. The emergence and continued strength of a CBWM system is closely associated with variables such as a small watershed, a small number of clearly-defined users, clearly-demarcated watershed boundaries, close proximity of the watershed to the village, moderately scarce watershed resources, and charismatic leaders.

The definite geographical and social units of village community, dyadic relationships, and traditional reciprocities, when reinforced by norms, beliefs, and operational rules, are the foundation for cooperation and compliance with the rules by the majority of resource users. The villagers were highly satisfied with the efficiency and equity in resource use under the common property regime, as they

evaluate the outcomes in terms of sustainable livelihood security rather than for short-term benefit. Minimal conflicts between *de facto* rights defined by local institutions and *de jure* rights defined by laws are also critical to institutional stability and help secure government recognition in CBWM.

The incorporation of local communities into the larger political economic system and the penetration of the market economy into the rural areas have changed traditional reciprocities based on dyadic relationships. Thus, community-based watershed management systems have evolved through the development of collectively-organized rules to govern the use of scarce watershed resources. Over time, the operational rules of CBWM have become formal institutions as the village community is transformed into a territorial organization, eventually integrated into the mainstream society.

This study demonstrates that there is an alternative to solve problems of the commons beyond the state and the market. Local institutional arrangements have been successful in managing several watersheds as the commons in Northern Thailand. It is suggested that co-management in the watersheds between the state and local communities is feasible in Northern Thailand. One potential strategy is to legalize CBWM institutions and empower the local communities to be able to manage their local watersheds effectively.

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Conversion Units**Currency**

19.40 Baht = CD\$ 1 = US\$ 0.7588

Area

1 Rai = 0.16 Hectare = 0.395 Acre

Year

B.E. Year = A.D. Year + 543

Administrative Units

***Changwat* = Province**

***Amphoe* = District**

***Tambon* = Commune or Sub-district**

***Muban* = Village**

Chapter 1

Introduction

Common property resources (CPR) are a class of resources for which exclusion is difficult and joint use involves subtraction (Berkes *et al.*, 1989). Interest in common property resources has been increasing not only in the academic community, but also amongst development planners facing practical problems in the local communities. Scholars and policy analysts have realized that they will not be successful in addressing resource degradation at the local level so long as the nature of property regimes and authority systems over natural resources are seriously misunderstood in policy formulation and misinterpreted in the design of development programs (Bromley and Cernea, 1989).

Hardin's metaphor of the "Tragedy of the Commons" (Hardin, 1968) has had a lasting influence on scholars and development planners. Not only has it become a dominant paradigm within which social scientists analyze natural resource issues, but it has also influenced the formulation of many development programs (Bromley, 1991). Natural resource degradation in developing countries is often incorrectly attributed to the failure of commons management, when it actually results from the dissolution of local institutions which were primarily established to manage sustainable resource use on a community basis.

The "institutions" mean rules, compliance procedures, and moral and ethical

norms designed to constrain the behavior of persons (North, 1981). The demolition of community-based institutional arrangements sometimes arose from interference by colonial administrators, and later the formation of the nation state. The state, in its enthusiasm for modernizing and rationalizing resource management, has often underestimated the capacity of the common property systems by which people have learned through long and often difficult experience to manage locally available resources to meet their own self-defined needs (Korten, 1986).

The dissolution of community-based institutions has also been a result of the socio-economic differentiation and growing stratification within communities. With increasing differentiation, the similarity and convergence in members' interests have gradually given way to increased divergence of interests and unequal concentration of power and wealth. This, in turn, enabled the more powerful elites to gain privileged access to appropriate the commons, consequently subverting and eroding the institutional arrangements for communal resource use (Bromley and Cernea, 1989).

A watershed is a landscape unit encompassing a complete stream drainage system and is equivalent to a catchment or drainage basin demarcated by a divide, as a watershed boundary (Pereira, 1989). The upper watersheds are often secondary regions. They are marginal in all the following aspects (Gibbs, 1986): geographically, they are usually remote and inaccessible - at the periphery rather than the core; economically, they are at the lower margin of production, where a resource base barely yields enough to meet basic needs; politically, people in these regions are

powerless and are not well integrated into the larger polity; and organizationally, they are often out of reach of the administrations of the national government. The upper watersheds of Southeast Asia are usually characterized by these attributes.

In contrast, the primary regions of Southeast Asia are the highly productive core areas in the downstream watersheds including the valleys and intermontane plains of the major rivers. These core areas are densely populated with highly fertile alluvial lands, and are closely linked to market places, sources of information, and centers of authority (Wittfogel, 1967). The distinction between primary and secondary regions is fundamentally important to watershed management to the extent that development strategies which have been successful in the core areas are not necessarily applicable to the hinterlands (Gibbs, 1986).

Generally, upper watershed residents are constrained by poverty and lack of appropriate technology. Thus their pursuit of arable land, timber, fuelwood, and some minor forest products has profound effects on soil, water, and forest resources of both upland and lowland areas (Magrath and Doolette, 1990). In addition, a lack of well-defined and enforced property rights also has contributed to land encroachment in upper watershed areas (Dixon, 1990). Open and free access to forest lands has prevailed amid confusion over legal and traditional rights in the resources.

In many regions of the developing world, common property regimes provide a complex system of norms and conventions regulating individual use rights to a variety of natural resources including forests, irrigation, fisheries, and rangelands

(Berkes, 1989). Uses of watershed resources have, until recently, been guided by customary laws, norms, rules of conduct, and even managed by membership groups with the use of traditional production techniques (Kunstadter *et al.*, 1978).

Although common property has proved to be a stable form of resource management in many traditional societies, the combined pressures of population growth, technological change, commercialization and political forces have destabilized many existing common property institutions. Under these pressures, the local institutions may adapt or otherwise fail to survive depending upon their performances in changed circumstances, their capacity for change, and their resilience (Berkes, 1989). Moreover, security of land tenure for watershed occupants is vital if they are expected to conserve and protect their watersheds (Cernea, 1985). Very few studies have focused upon appropriate strategies to provide this assurance. There is also limited knowledge about the response of villagers to alternative forms of property regimes in different settings (Saplaco, 1985; Tangtham, 1986). Thus, many watershed management problems are related to property regimes.

1.1 Problem Identification

The watersheds in Thailand are *de jure* governed by the state-property regime and management has been left entirely to government administration, mainly through the Royal Forestry Department (RFD) because until recently these areas were extensively forested. However, under this governance the forest area has declined

dramatically, from 53 percent of the country area in 1961, to 29 percent¹ in 1986 (Abhabhirama *et al.*, 1988). Forests and watershed resources have *de facto* become an open-access resource which are susceptible to unlimited exploitation (Hirsch, 1990a; Feeny *et al.*, 1990; Ganjanapan, 1992).

Initiatives to privatize forest resources have so far failed to stop deforestation. Moreover, in many cases they may even have accelerated forest depletion. Furthermore, privatization often tends to concentrate wealth in the hands of the few, at the expense of equity (Tongpan *et al.*, 1990; Handley, 1991). In fact, private reforestation by means of a large-scale commercial forestry does not alleviate poverty since it fails to distribute benefits to the local people. Nor does it recognize traditional rights or any interest or capability in local communities to manage the forest resource around them (TDRI, 1990). All in all, given their lack of the essential forest functions of biological diversity and watershed protection, and their controversial impact on water flow, monocultures such as eucalyptus plantations should not be considered as forests, but rather as another cash crop (TDRI, 1990).

The watersheds in Northern Thailand, like many peripheral areas in developing countries, are at the "frontier" where a limited proportion of people have state-recognized tenure rights, and a large portion of forested and unforested land is usually designated as national reserved forest (Molna, 1990). Occupants of these areas include the settlers who often belong to the majority ethnic group (*Khon Muang*) whose actual land tenures tend to be the same as those recognized elsewhere in the country, the ethnic minority groups (*hilltribes*) who have a traditional land-use

and informal tenure systems, and recent immigrants (could be both *Khon Muang* and *hilltribe*) on newly-cleared lands.

Local communities in Northern Thailand, being constrained by the rugged terrain and hilly landscape, have for a long time preserved community forests in the headwaters (*Ton Nam*) of watersheds to sustain water supply for the traditional irrigation systems or *Muang Fai* (Faichampa, 1990; Ganjanapan, 1992;). The people of the North have usually set up cooperative organizations whose members use the water and cooperate in constructing, repairing, and managing the irrigation facilities. The rights and duties of the members of these organizations have been codified and clearly stipulated, and the punishment of offenders strictly enforced (Shigetomi, 1992). Along with water resources, the forests and woodlands that surround the villages provide important resources for sustaining the livelihood of households and their economic productivity. The watersheds also provide minor forest products - natural foodstuffs and other daily necessities - and places for the cattle to graze.

The watershed forests, or *Paa Ton Nam*, are strictly protected by the community. In most cases, these forest areas are the headwaters from which the community draws the water supply. The watershed spirits, or *Phi Khun Nam*, are regarded as the protectors or guardians of the watershed forests. These beliefs provide an underlying morality for the management of watershed resources that are vital for the livelihood of the communities (Ganjanapan, 1992). The government and the local communities, however, do not seemingly share the same vision of watershed forests. That is, while local communities perceive nearby forests as theirs and as

sources of cultivated land, food, water for irrigation system, and other necessities for their livelihood, the government perceives the watershed forests as state property to be conserved or appropriated for the interest of the entire nation (Faichampa, 1990). The government officials are usually sceptical of the local community's ability to manage the watershed forests.

Initially, local communities felt no need to control or regulate the use of watershed resources because they were plentiful and mostly untouched. However, over time the mainstream societies as well as the village communities have changed. Watershed forests have been overexploited by various activities such as commercial logging, shifting cultivation, and the operation of large-scale development schemes. In addition, population growth, rising demands on watershed resources resulting from commoditization, and the incorporation of local economy and peasantry into the national and global market economy have, combined together, placed intense pressure on the watersheds. These pressures brought the peasants together to form, or to adjust in some cases, local institutions to protect watersheds from outside threats as well as competitive uses within their community. In the context of collective action, the traditional cooperative activities of the *Muang Fai* system have laid out a potential foundation of institutional arrangement for the community-based watershed management (CBWM).

The state property regime has rarely proven successful in coping with watershed degradation problems because of the ineffectiveness of law enforcement (Tan-Kim-Yong *et al.*, 1988). Meanwhile the imposition of a private property regime

on watershed resources is still open to question in terms of equity and sustainable livelihood concerns. Watershed resource management is in a dilemma. It is thus necessary to understand the essential connection between property regimes and resource management, and to locate conceptually the common property regime in the continuum between the "free-for-all" of an open-access regime and the complete individualization of the private-property regime (Berkes, 1989). It is timely to examine another potential alternative, that is, community-based watershed management (CBWM) under local institutions existing in Northern Thailand. This is the main theme of this study.

1.2 Research Questions

The legacy of the "Tragedy of the Commons" (Hardin, 1968) and the conventional wisdom of collective action, i.e. the Prisoner's Dilemma (Dawes, 1975; see Ruge, 1984a; 1986) and the Logic of Collective Action (Olson, 1965), have polarized policy prescriptions to solve the problems of the "free rider" in common property resources (Ostrom, 1990). The first pole is to nationalize the commons to become state property. The second is to privatize the commons to the market system.

By failing to understand that institutional arrangements over natural resources are not bimodal, many policy analysts are led to embrace one pole at the expense of the other (Bromley, 1989). This leads Ostrom (1986a) to argue that the limitation to either the "state" or the "market" means that the social-scientific 'medicine cabinet'

contains only two nostrums. In reality, neither the state nor the market is uniformly successful in enabling individuals to sustain productive use of natural resource systems (Berkes, 1989). Many communities in various regions of the world rely on local institutions to govern some resource systems with a reasonable degree of success over long periods of time (Ostrom, 1990).

Some social scientists (e.g. Ramitanondh, 1985; Pinkerton, 1987; 1993), on the other hand, tend to romanticize the local communities and their abilities to apply wisdom and morality in their relationships with the resources and each other (McCay and Acheson, 1987). They have relentlessly criticized the Tragedy of the Commons and Prisoner's Dilemma's models, and overwhelmingly emphasized interdependence, communitarianism, and cooperation as the basic facts of human interactions that can lead to sustainable resource use. This group of scholars, somehow, tends to ignore the fact that today all local communities are encapsulated within, or fully integrated into, larger socio-political systems as well as market economy systems. Harsh reactions to Hardin's scenario tend to polarize the local communities and their government. They often praise the ecological and social wisdom of the former without closely examining the latter or possible co-management between the two levels of human organization and experience (McCay and Acheson, 1987).

This study recognizes the above and seeks to shed some more light on this dilemma by examining the following questions with specific relevance to Northern Thailand.

- (1) How might a user community be able to achieve an effective form for governing and managing its common property resources - the watersheds?**
- (2) What are the key factors that can enhance or influence community members to develop collective actions and establish local institutional arrangements for watershed management?**
- (3) How have local institutions of community-based watershed management (CBWM) evolved? Under what conditions will they be able to persist in the changing situation of village communities in Northern Thailand?**

To answer these questions this study selected four local communities in Northern Thailand for a case study. The four communities represent different manifestations of community-based watershed management. Comprehensive analysis of local institutional arrangements will be investigated through the conceptual framework and research method outlined in Chapter 4.

1.3 Justification of the Study

The goal of this study is to explore the theoretical alternatives and practical solutions for common property resource problems in watershed management that go beyond the state and market orientation. A focus of the study is on the local institutions existing in different environment and community settings of Northern Thailand.

In terms of scholarly significance, this study, contrary to conventional theories

emphasizing competitive interactions, attempts to construct inductively a grounded theory² of the commons by mean of empirical study based on the concepts of interdependence, cooperation, and reciprocity. Conventional wisdom, such as Darwin's survival of the fittest and Hardin's tragedy of the commons have focused on the concepts of competition, predation, and parasitism, less attention has been paid on positive ecological and social interactions such as cooperation, commensalism, and mutualism (Berkes, 1989).

Cooperative use of common property resources has, until recently, received very little attention in the literature. This study therefore tries to contribute to the paradigm of common-property resources. A new dimension on the theory of the commons would be able to account for sustainable resource management. Alternative models based on the grounded theory (Strauss and Corbin, 1990), rather than on the conventional models or the metaphors, could provide a basis for sustainable use of common property resources.

Ostrom (1990: p.216) has added that the models which social scientists tend to use most in analyzing the problems of the commons have the perverse consequences of increased central control of political authority. She argues:

First, the individuals using CPRs are viewed as if they are capable of short-term maximization, but not of long-term reflection about joint strategies to improve joint outcomes. Second, these individuals are viewed as if they are in a trap and cannot get out without some external authority imposing a solution. Third, the institutions that individuals may have established are ignored or rejected as inefficient, without examining how these institutions may help them acquire information, reduce monitoring and enforcing costs, and equitably allocate appropriation rights and provision duties. Fourth, the solutions presented for "the" government to impose are themselves based on

models of idealized markets or idealized states.

As a result, current theories of collective action do not take into account the ability for institutional change; the effects of external political regimes in an analysis of how internal variables affect institutional evolution; and the information and transaction costs. Having recognized these problems, researchers can further acquire empirical evidence of collective action in the commons. The findings derived from the empirical studies can be used to advance theoretical understanding of a theory of self-organized collective action, in addition to the existing theories of externally-organized collective action (Ostrom, 1990).

For policy implications, common-property regimes provide the potentiality for the local community to manage natural resources in directions that meet multiple criteria of importance to rural people. Efficiency, equity, and sustainable livelihood appear to be optimized by communities dependent directly upon collectively-managed renewable resources (Berkes, 1989). In principle, common-property regimes allow the local resources on which the villagers collectively depend to be managed on a sustainable basis (Gibbs and Bromley, 1989). The adoption of private or state-property rights may not be able to provide such assurance since the consequences for productivity, equity, and livelihood security would be different.

The policy makers of new institutional arrangements for conservation and development of natural resources need to be aware of the strengths and weaknesses of common property regimes to guide their work. Moreover, acknowledging local institutional arrangements which are responsive to local conditions and which are

locally managed, articulates a willingness to accept that the variations in ecosystem and social system should be reflected in policy and planning. This in turn may imply an endorsement of popular participation and more decentralized administration in resource management (Gibbs and Bromley, 1989).

Geographers, along with members of other disciplines, have studied the effects of institutions on various aspects of society, the economy, and the environment. This approach has contributed to significant insights in several branches of the subject (Flowerdew, 1982). Geographers have drawn mostly upon concepts from political science, economics, sociology, anthropology, and public administration to account for, assess, or prescribe the strategies through which resource management policies have been, or might be, executed. The purpose of acquiring such knowledge is to understand spatial allocations of resources, relationships between man and his environment, or the complexity of regions (Mitchell, 1989). In this context, spatial scales are important, as geographers seek to examine institutional arrangements adopted at local, regional, and national levels.

O'Riordan (1971) stated over 20 years ago that one of the most fundamental research needs in resource management was the analysis of how institutional arrangements were formed, and how they evolved in response to changing environments within, and outside, the community. This in turn affected the implementation of resource policies in terms of the range of choices adopted by individual users.

Geographers have, until recently, been reluctant to consider the existence of

institutional effects in their attempts to explain empirical reality. This was essentially true for traditional geography, where description of countries and regions tended to mention very little about the political and institutional structures. Manion and Flowerdew (1982) have pointed out that textbooks of regional geography during the 1960s continued to focus on traditional societies and the colonially-based export economy at a time when the nation-state formation and the associated transformation of institutions were creating new economic and social environments in most of the Third World. This lack of attention and disregard for institutional factors is a result of the old theme of geography as the study of how the physical environment has affected humans.

It is also observed by Manion and Flowerdew (1982) that although the geographical study of institutions is often relevant, perhaps essential, to a process of policy making, its aim is not directly to help in policy formation *per se*, but tends to describe, analyze, and construct theories concerning the impact of policies.

This study hopes to contribute to a growth in the institutional approach in geography by focusing on the local institutions in managing the watersheds as common property resources. The results of this research may offer alternative policies for resource management at the local community level.

1.4 Organization of Dissertation

This dissertation is organized into nine chapters. The next chapter explores

the theoretical background and reviews the relevant literature. First, the differences between property right regimes are categorized. Second, theories of common property resources are examined. These include the conventional theories, their critiques, and the fallacies. Then the theoretical propositions and the alternative models of common property resources are stipulated, including public choice theory, institutional approach, and a framework for institutional analysis. Finally, some case studies of common property resource management are brought into consideration, in terms of their success and failure.

Chapter three deals with the study site. It provides a brief geographical context of Northern Thailand. The selection of the communities is described following by a profile of the four selected communities. Chapter four gives the details about the conceptual framework and research method. Relevant theories and the adopted conceptual model are reconceptualized to form an analytical framework for the empirical study. Then, the procedures of research conduct are presented in a step-by-step pattern. These include research design, methods of data collection, tools, field work, data processing and analysis.

Chapter five provides the basic concepts of watershed management and the physical and technical attributes of the watersheds in the four selected communities. Chapter six mainly focuses on the socio-economic characteristics of the four selected communities in relationship to the emergence and development of community-based watershed management. Chapter seven is about the institutional and organizational arrangements for community-based watershed management in the four selected

communities. Institutional analysis of the three-tier level of rules is presented with emphasis on the local institutions.

Chapter eight contains three major sections: first, the patterns of interaction of the villagers in their use of watershed resources; second, an assessment of the outcomes and consequences of resource use from the perspective of the local people; and third, a discussion on local institutions of CBWM in the changed environments of the local communities. Chapter nine draws together the results and findings discussed in the previous chapters and theoretical propositions. The recommendations include policy implications, proposed management strategies and some suggestions for further study.

Notes

1. The figures for forest area in Thailand show many discrepancies among the different sources. For example, the RFD's statistics show that forest areas accounted for 27.15 percent of the country area in 1989 (RFD, 1992). However, the area with actual forest coverage may be less than this figure.

2. A theory that is inductively derived from the study of the phenomenon it represents. That is, it is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon (Strauss and Corbin, 1990).

Chapter 2

Theoretical Framework and Literature Review

In this chapter, the theoretical background of common-property resources will be examined including the critiques and fallacies of conventional models. Then, the theories and concepts of institutions and institutional analysis will be brought into the discussion as an alternative solution for the problems of common property resource management. While this approach focuses on the political economy, that is, local institutions and the resource base, it is not from a critical theoretical perspective (Harvey, 1990). Finally, the relevant literature or previous studies of common-property resources and local institutions will be examined.

2.1 Property Right Regimes

Before concentrating on common-property resources, it is essential to understand the concept of property rights as a basis for further discussion. In terms of property-right regimes, a resource management regime is a structure of rights and duties characterizing the relationship of individuals to the particular resource and to one another regarding that resource (Bromley and Cernea, 1989). The institutional arrangements are established to define the property regime over the natural resources, whether that resource regime would be classified as private property, state

property, or common property. These institutional arrangements define property relations between one individual vis-a-vis others both within and outside the group by stating that one party has an interest in the particular resource that is protected by a right only when all others have a duty to respect that specified right (Bromley, 1991, emphasis in original).

Meanwhile, "a right is the capacity to call upon the collective to stand behind one's claim to a benefit stream" (Bromley, 1991: p.15). When one has a right to the particular resource one has the expectation in both the law and in practice that their claims will be respected by those with duty, or protected by the state. Rights can only exist when there is a social mechanism that gives duties and binds individuals to those duties. It is essential to understand that property in this context is not an object such as land, but is rather "a benefit (or income) stream, and a property right is a claim to a benefit stream that the state will agree to protect through the assignment of duty to others who may covet, or somehow interfere with, the benefit stream" (Bromley, 1991: p.2, emphasis added). In this sense, "property" refers to a bundle of rights relating to the use and transfer of natural resources (Ciriacy-Wantrup and Bishop, 1975).

It is now essential to consider briefly the different types of property regimes. More details can be found in Bromley (1989; 1991) and Bromley and Cernea (1989).

(1) *State property regimes*. In state property regimes, rights to the use of the resources rests in the authority of the state. The state, as an eminent domain, has the ultimate authority over the resources. Individuals have a duty to comply with

use/access rules determined by authorized agencies. Agencies have the **rights** to determine use/access rules. Individuals may be able to make use of resources, but only at the forbearance of the state. In the case of Thailand, national reserve forests, national parks, and crown lands are examples of state property regimes. State-property regimes can be transformed to other resource regimes, or *vice versa*. In most cases, the state directly manages the use of state-owned natural resources through government agencies. The state may, however, lease the resource to groups or individuals who are thus granted concession or usufruct rights over it for a specified period of time, but the state still maintains the rights to revoke the control of such resources (Bromley and Cernea, 1989).

(2) *Private property regimes*. This is probably the most familiar property regime in everyday life. Individuals have **rights** to undertake socially acceptable uses, and have **duty** to refrain from socially unacceptable uses (Bromley, 1991). At the same time, others have **duty** to refrain from obstructing socially acceptable uses and have a **right** to expect that only socially acceptable uses will occur. Most people may think of private property as individual property, however, corporate property is also private property, yet it is owned and managed by a group. Private property provides the owner the legally and socially sanctioned ability to exclude others. This very strength of private property regimes in land and related natural resources can also be its greatest weakness, particularly in terms of equity distribution (Bromley, 1991). Private property is also derived from the state.

(3) *Common property regimes*. Under this resource management regime, the

management group (the "owners") has rights to exclude non-members, and non-members have duty to comply with exclusion. Individual members of the management group (the "co-owners") have both rights and duties with respect to use rates and maintenance of the resources owned. Common property rights are a special class of property rights which assure individuals access to resources over which they have collective claims. Common property is created when members of an interdependent group agree to limit their individual claims on a resource in the expectation that the other members of the group will do likewise (Gibbs and Bromley, 1989). Rules of conduct in the use of a given resource are maintained to which all members of the group abide. Stevenson (1991: p.46) gives a synoptic definition of common property as "a form of resource management in which a well-delineated group of competing users participates in extraction or use of a jointly held, fugitive resource according to explicitly or implicitly understood rules about who may take how much of the resource¹".

In one sense, common property constitutes private property for the group. The management groups may vary in nature, size, and institutional structure, but they are social units with clearly-defined membership and boundaries, with certain common interests, with continual interactions among members, with some common norms, and often with their own endogenous authority systems (Bromley and Cernea, 1989). For instance, these groups include tribal groups, village communities, neighbourhoods, and kinship systems.

In many regions of the developing world, natural resources are managed as

common property characterized by group ownership with management authority vested in the respective group or its decision makers; some are managed by the public sector as state property, and some are not managed at all but are, instead, open access or "free for all."

(4) *Non-property regimes*. This is an open access situation in which there is no property right in the particular resource. There is no defined group of users or "owners" so the benefit stream is available to anyone who first captures it. Individuals have both privilege and no right with respect to the use rates and maintenance of the resources (Bromley, 1989). A resource under open access regime will belong to the party who first exercises control over it, "first come first served."

Generally, open access results from the absence, or breakdown of a management and authority system of other types of resource regimes. It could occur either because the natural resources have never been incorporated into a regulated social system, or because they have become open-access resources through institutional failures that have undermined former communal, state, or private property regimes (Bromley, 1991).

The classification of property right regimes outlined above helps understand the status of watershed resources and management problems in Thailand. Watershed degradation in general results from the failure of the state to exercise its rights in protecting public values in the resources. However, it will be shown later in this study that in the North potential problems of watershed degradation can also originate from institutional breakdown of communal management of local watersheds as the

state fails to recognize traditional rights of the local communities.

2.2 Confusion of Property Right Regimes and Consequences in Policy Prescription

An important problem of common property regimes is a "free rider" when an individual shirks responsibility, fails to contribute to the community or group, or violate the rules of conduct, while expects the others to contribute, or follow the rules (Runge, 1984b; 1986). It is often argued that the incentive for this behavior is rational from the point of view of individual self-interest. This situation leads to an outcome of mutual destruction in which the group as a whole is made worse off as described by Hardin (1968) as a metaphor, "the tragedy of the commons".

However, it is crucial to distinguish between common property and open access regimes if policy in resource use is to be formulated. That is, problems of open access arise from unrestricted entry, whereas problems of common property result from tensions in the structure of joint use rights and exclusion rules adopted by a particular community or group (Runge, 1986). By confusing an open access regime with a common-property regime, the metaphor ignores the potential of resource users to act together and institute checks and balances, rules and sanctions, in their own interactions within a given environment and certain community settings (Bromley and Cernea, 1989).

Common property is not "everybody's property." The term "common property"

should be restricted to those resources with communal arrangements for exclusion of non-owners and for allocation among the co-owners (Ciriacy-Wantrup and Bishop, 1975). The critical distinction between "open-access resources" and "common-property resources" is that open-access is free-for-all, while common-property represents a well defined set of institutional arrangements concerning who may and who may not be eligible to make use of the resources, and the rules governing how the accepted users should conduct themselves (Bromley, 1985).

It is important to make it clear about the incentives that exist in common property regimes. The myth of the commons tends to make one believe that the only incentive is to pillage and plunder natural resources for they may not be left available in the future. In fact, a more correct understanding is to define a common property regime by group ownership in which the behaviours of all members of the group are subject to be regulated by accepted rules and open for all to monitor each other. In many cultures compliance with norms of the local community is an effective sanction mechanism against deviant behaviour.

A viable common property regime thus has a built-in structure of both economic and non-economic incentives that encourage compliance with the conventions and institutions. Nonetheless, in many settings, those sanctions and incentives have become malfunctional because of pressures beyond the control of the group, or because of internal breakdown that the group was unable to handle. Yet that does not demolish the essential point, that in a community setting in which individual conformity to social norms is the dominant ethic, common property

regimes provide a cultural context compatible with, and in fact vital for, effective performance of local institutions.

Compliance, protected and reinforced by an authority system, is a necessary condition for the viability of any property regime to ensure that the expectations of the rights holders are met. Private property would become open access unless the requisite authority system (i.e., usually the state apparatus) assuring the rights and duties are adhered to. The same requirements are needed for common property. If the authority system breaks down, for whatever reason, then the group management of resource uses cannot be exercised any longer, common property degenerates into open access.

In common property regimes two problems may arise. The first is a breakdown in compliance by co-owners as a result of widespread privatization and the penetration of the market economy. Secondly, if the state holds common property in low esteem and disregards the interests of those groups of citizens dependent upon common property resources, then external threats to common property will not receive the same governmental response as would a threat to private property. For example, if the peasants of upper watersheds are regarded as politically marginal, then the property regimes of these peasant communities will be only indifferently protected against threat from others. If those threatening upland peasants, e.g., urban-based entrepreneurs, receive more favor from the state, then the protection of upper watershed resources under common property against encroachments for logging and the large-scale plantations will be at risk.

Resource degradation may also arise from population growth within the relevant social unit. The increase in the use of the given renewable resource, though exceeding the ability to sustain its annual yield, cannot be stopped because of the nominal "rights" of every villager to take what he/she needs to survive. As a village expands, and therefore as the number of co-owners grows, the total demands on the resource units will ultimately exceed the rate of natural regeneration of the resource system. Failure to deal appropriately with the change in the size of the group affects the equilibrium and integrity of the system. In a situation in which the supply remains constant, then it is obvious that very soon no villager will be able to satisfy his/her "right" with anything other than what he/she can capture by being there first (Bromley and Cernea, 1989). In such a situation, a common property regime for the group becomes an open access regime for those within the group. This is essentially what has happened amongst the hilltribe groups of Northern Thailand (e.g. see Cooper, 1984; Dearden, 1993).

The inducement of a private property regime, following changes in resource endowment, technology, and property relations in developing countries, often creates conflict with prevailing socio-cultural values (Ruttan and Hayami, 1983). Regarding the nature of the resource and the socio-cultural characteristics of its users, it may sometimes be more appropriate to restore a common property regime than to attempt to induce privatization.

Converting an open access situation to a common property regime is a complicated process that cannot be done easily by administrative decree. When such

a process is attempted, the design of the change process must take into account a number of general variables and their local context. These variables pertain both to the physical environment and to the existing socio-cultural systems. According to the conclusion of the Conference on Common Property Resource Management (The National Research Council, 1986), there are at least four main sets of variables suggested critical for such a process and each must be meticulously considered if this process is to be deliberately pursued. They are:

- (1) the nature of the resource itself;
- (2) the supply-demand conditions of the resource;
- (3) the socio-economic characteristics of the resource users; and
- (4) the characteristics of the legal and political environments.

These four sets of variables (Ostrom, 1986b; also cited in Bromley and Cernea, 1989; and Bromley, 1991) will be included in the conceptual framework of this study.

The inducement of a state property regime to solve the resource degradation problem has been widely accepted since the post-colonial era. In fact, in the last two decades many local resources have been nationalized through central regulatory policies, new legal frameworks, and direct administration (Blaikie, 1987). However, some analysts come to the conclusion that this shift in the locus of control has not resulted in more effective natural resource management (Korten, 1986). It has, instead, simply weakened local common property regimes (Gibbs, 1986). As a result, Bromley (1991: p.10) observed, "to set the people against natural resources only invites cynicism and lawlessness, and does little to protect natural resources".

Natural resource development projects run by the state although clearly specific in physical components are often vague and incomplete in local institutional development. This was found in the Northern Agricultural Development Project, in Thailand. According to the project framework, village woodlots were to be established and first operated by the Watershed Management Division of the Royal Forestry Department "...until the villagers are in a position to assume responsibility for them" (Bromley and Cernea, 1989: p.29). This project failed to articulate exactly how this was to happen and what were the anticipated property regime over land and trees. Moreover, there was no measurement to determine that villagers are finally ready to take over.

Another example from Thailand concerns the modification of rights in land and related resources in the interest of the national government. Population growth and the scarcity of resources have led the government to tighten their control over forest reserves, and to introduce a system that would control land use, determine ownership, and generate revenue from land through strengthening the legal framework for private land ownership (Feeny, 1982; World Bank, 1984; Feeny, 1988a). The government exercises its power of land titling through the Land Code 1954, and has undertaken a nationwide land titling program with a loan from the World Bank. The rationale for this program was that the existing land status situation leads to:

...inappropriate land use classification, increasing number of landless, increasing tenancy especially in rural areas, illegal cultivation in government reserves, lack of secure tenure for many land occupiers who have possessory rights, a high rate of squatter settlement in rural

and urban areas, and increasing concern about soil erosion and general environmental degradation as shown most dramatically by loss of forest cover in the mountainous regions and increased flooding in the plains (World Bank, 1984, p.2, also quoted in Bromley and Cernea, 1989).

Although the security of land ownership is important, and its impacts have been studied recently in the case of Thailand (Feder *et al.*, 1988), neither privatization nor state intervention is sufficient to solve these problems. Moreover, it appears that the national legislation concerning natural resources in Thailand, until recently, aimed to generate revenue for the government rather than to conserve the resources (Feeny, 1988b).

2.3 Theories of Common Property Resources

Most scholars (e.g., Berkes, 1989; Bromley and Cernea, 1989; Gibbs and Bromley, 1989) share the same definitions of a common property resource as a type of resource subject to joint and subtractive use among a definite group of users and exclusion is almost impossible. Ciriacy-Wantrup and Bishop (1975), however, considered common property resource as a social institution. They employed the term "common property" to refer to "a distribution of property rights in resources in which a number of owners are co-equal in their rights to use the resource" (p.714, emphasis in original). This means that the co-owners' rights are not lost through non-use. It does not mean that the co-equal owners are necessarily equal in terms of the quantities of the resource each uses over time. The concept implies that potential resource users who are not members of a group of co-owners are excluded. They

sometimes use the terms "common property resource" or the "commons" to represent both the institution (as a resource regime) and the resources subject to the institution.

Ostrom (1986b) advocates the use of the term "common pool resource" for the resource itself, reserving the use of "common property" to refer specifically to communal property-management systems. Meanwhile, Bromley (1991) urges the abandonment of the term "common property resource" in favor of the more correct "common property regime". However, it is understood in this study hereafter that the term "common property regime" is used in the sense of the particular institutional arrangement of resource use or "resource regime", whereas the terms "common pool resource" and "common property resource" or CPR as well as the "commons" are used interchangeably to represent a resource itself.

Ostrom (1990: p.30) refers to a *common pool resource* (CPR) as "a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use." She also suggests that, in order to understand how CPRs are organized and governed, it is necessary to "distinguish between the *resource system* and the flow of *resource units* produced by the system, while still realizing the dependence of the one on the other ... Resource systems are best thought of as stock variables ... Resource units are what individuals use or appropriate from resource systems"² (emphasis in original). For example, resource units are accounted by the tons of fish harvested from a fishing ground, the acre-feet or cubic metres of water withdrawn from an irrigation

system, and timber or bundles of firewood cut from watershed forests. The fishing grounds, irrigation systems, and watersheds are, respectively, the resource systems.

Understanding the distinction between the resource system as a **stock** and the extraction of resource units as a **flow** is especially useful in the management of **renewable** resources, where it is possible to indicate a replenishment rate. As long as the average rate of use does not exceed the average rate of replenishment, a renewable resource is sustained forever (Ostrom, 1990). The appropriation of resource units from the CPR can be undertaken by co-appropriators simultaneously or sequentially. The resource units, once taken by individual users, are not subject to joint use or appropriation, but rather become private property.

From the definitions given above, CPRs basically share two important characteristics (Feeny *et al.*, 1990). The first is **excludability**, that is, by the physical nature of the resource, control of access by potential users may be costly and, in the extreme cases, virtually impossible. For instance, range and forest lands typically pose problems of exclusion. The second basic characteristic of CPRs is **subtractability**, that is, each resource unit appropriated is capable of subtracting from the resource system. These two attributes of resources can be used to classified four types of goods (resources) in the following matrix (Figure 2.1).

Attributes	Subtractive consumption	Nonsubtractive consumption
Costly to exclude	common pool resources (e.g. watershed, fisheries)	public good (e.g. national defense)
Not costly to exclude	private goods (e.g. bread, car)	toll good (e.g. cable TV.)

Figure 2.1 Classification of Goods and Resources
(from Shui Yan Tang, 1989).

Ostrom and Ostrom (1977) summarized the conditions under which problems of managing the CPRs could occur whenever:

- (1) ownership of the resource is held in common;
- (2) a large number of users have equal rights to use the resource;
- (3) no mechanism to control the rate of use of the co-owners; and
- (4) total use or demand upon the resource exceeds the supply.

2.3.1 The Conventional Theories of Common Property Resources

(1) *The Tragedy of the Commons*. This metaphor was used by Garrett Hardin (1968) as an explanation for the exploitation of natural resources that are held in common. Since then it has become part of the conventional wisdom of common property resource management referred to as the theory of the commons.

In his article first published in *Science*, Hardin (1968) set forth to dramatize the problems of population growth and limited natural resources. He then turned to the problem of the commons, and suggested the following scenario:

The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. ..., the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. ... But this is the conclusion reached by each and every rational herdsman sharing the commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit - in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all (Hardin, 1968: p.1244).

Hardin really considered common property resources the same thing as open access. According to Ostrom (1990) Hardin was not the first to notice the tragedy of the commons. To some extent Aristotle as well as Thomas Hobbes observed the nature of the use of the commons although they did not relate specifically to natural resources. More than a decade before Hardin's *Tragedy of the Commons* was published H. Scott Gordon (1954) described the situation of the commons in fisheries as "everybody's property is nobody's property" (p.124 quoted in Ostrom, 1990: p.3). The same outcome is that everybody rushes to make use of the resource today for there may not be any left for tomorrow.

Hardin and his colleagues concluded that there was no alternatives for resources owned in common unless there was some coercive mechanisms. A decade later, they came up with the alternative of Hobbes' *Leviathan*, or "socialism" in Hardin's term, and the "private enterprise system" (more details in Ostrom, 1990).

(2) *The Prisoner's Dilemma*. The Prisoner's Dilemma - one form of *Game Theory* - gets its name from the story of two prisoners who are arrested for car theft and arm robbery, and being interrogated separately. The situation faced by its two

prisoners is used to illustrate the choice of individuals whether to act in self-interest or cooperatively. The idea is applied to resource management situations. In the simple form described by Runge (1986), the Prisoner's Dilemma game involves two players in interactions, each facing two possible strategies: that is, each can choose the strategy of cooperating, or that of defecting (not cooperating). Since the players make their choices of strategy independently of each other, their two pairs of strategies produce four possible outcomes as shown in figure 2.2.

Matrix A

First Prisoner	Second Prisoner	
	Cooperate	Defect
Cooperate	(1,1)	(-2,2)
Defect	(2,-2)	(-1,-1)

Matrix B

First Prisoner		
	1	-2
Cooperate	1	-2
Defect	2	-1

Figure 2.2 Prisoner's Dilemma (from Runge, 1986).

The four possible outcomes are represented by the four pairs of numbers, which are called payoff pairs. The payoffs in Prisoner's Dilemma work like this: if both players cooperate together, they each receive a positive payoff of 1 (represented by payoff pair 1,1 in matrix A). If both defect, they both receive negative payoffs of -1 (-1,-1). If one cooperates and the other defects, the cooperator receives an even worse payoff, -2, while the defector is well off with a positive payoff of 2. There is,

therefore, strong incentive to defect. This can be seen clearly by isolating the first prisoner's payoffs (matrix B in figure 2.2): the first prisoner (row in matrix A) gets more in each column from defecting than from cooperating. Indeed, defection is a "dominant strategy" for each player (Hardin, R., 1982). To protect him/herself, if not to further interests, each has a reasonable strategy to defect whatever the other does. "Rational" decisions by each prisoner individually make both worse off. Even if communication between the individuals results in an agreement to cooperate, both have an incentive to break it (Runge, 1986).

The Prisoner's Dilemma extends to CPR use by presenting the choice of either cooperating with others in a rule of restrained use or not cooperating (Wade, 1988). Thus the individual's preference order of choices could be:

- (1) everyone else abides by the rules while he/she enjoys unrestrained access (he/she free rides or shirks);
- (2) everyone, including him/herself, follows the rules (cooperate);
- (3) no one follows the rules; and
- (4) he/she follows the rules while no one else does (he/she is suckered).

According to the Prisoner's Dilemma model, the dominant and stable outcome is the third-ordered strategy - no one follows the rule. In this situation the only solutions are either coercion from outside the group to force people to reach and maintain the social optimum (the second-ordered strategy), or a change into a private property regime.

The appeal of the Prisoner's Dilemma game framework is its generality and

its apparent influence in portraying a variety of social interactions. It tends to support the assertion of the state authority to enforce the rules and punish the violators.

(3) *The Logic of Collective Action*. Mancur Olson's theory of the Logic of Collective Action (Olson, 1965), in the same manner as the Tragedy of the Commons and the Prisoner's Dilemma, argued the optimism of cooperation within the group. Olson's theory stated that voluntary collective action will not occur in the use of public goods. It challenged the presumption that the prospective of a benefit for a group's welfare would be sufficient to produce collective action within the group to achieve that benefit. Olson contended that:

But it is *not* in fact true that the idea that groups will act in their self-interest follows logically from the premise of rational and self-interested behavior. It does *not* follow, ..., even if they were all rational and self-interested. Indeed, unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, *rational, self-interested individuals will not act to achieve their common or group interests*. (Olson, 1965: pp.1-2, emphasis in original)

Olson dismissed any possibility inside the group that would lead the individuals to pursue common interests. However, his premise seems to be less pessimistic when he did exempt small groups from intermediate and large groups for the reason that the situation in small groups is much more complicated. A 'small' group is one in which a single individual has an interest in providing the public good irrespective of the contribution of others. Intermediate groups differ from large groups in that the actions of single member with regard to whether he/she contributes or not are "noticeable" in an intermediate groups, but not in a large group. Therefore intermediate groups can detect "free riding" more easily than large

groups can, because of noticeability.

Olson (1965) pointed out that the likelihood of voluntary collective action is high for small groups, low for large ones, and moderate for intermediate ones. His examples of large groups are organizations like trade unions or professional associations with a widely scattered membership and without geographic boundaries. Interest groups in peasant communities are presumably intermediate groups (Wade, 1988).

These conventional theories - the Tragedy of the Commons, the Prisoner's Dilemma, and the Logic of Collective Action - are closely related concepts that have defined the way in which individuals have viewed the problem when attempting to attain collective benefits. Whenever an individual cannot be excluded from the benefits that others provide, each individual will be motivated to free-ride on the efforts of others. The temptation to free-ride, if it dominates the decision process, will lead all users to the situation of mutual disaster. Alternatively, some may contribute while others shirk, leading to a suboptimal level of provision of the collective benefit. These models are thus very powerful in explaining how well rational individuals can produce, under some circumstances, outcomes that are not "rational" when viewed from the perspective of all those involved at the community level (Ostrom, 1990).

These conventional theories are special models founded on extreme assumptions rather than the general ones. They are useful for predicting behavior in large-scale CPRs in which the institutional arrangements are weakening. The

upcoming discussion will focus on the false and inappropriate use of these model in the village community.

2.3.2 Critiques and Fallacies of the Conventional Theories

The Tragedy of the Commons, the Prisoner's Dilemma, and the Logic of Collective Action have become the conventional wisdom of CPR management problems and collective action of resource users. Ostrom (1990) describes the metaphorical influences of these three models:

What makes these models so interesting and so powerful is that they capture important aspects of many different problems that occur in diverse settings in all parts of the world. What makes these models so dangerous - when they are used metaphorically as the foundation for policy - is that the constraints that are assumed to be fixed for the purpose of analysis are taken on faith as being fixed in empirical settings, unless external authorities change them. (Ostrom, 1990: pp.6-7).

Ostrom refers to the situation in the Prisoner's Dilemma model that the prisoners cannot change the constraints imposed on them by the authority; they are in jail. She points out that in the real world "not all users of natural resources are similarly incapable of changing their constraints" (Ostrom, 1990: p.7). As long as resource users are still regarded as prisoners or ones who threaten the resources, policy prescriptions will adopt this metaphor.

The three models, with the presumption of an inevitable tragedy, have been applied to represent diverse situations of collective action. Policy makers who have unconditionally adopted these original models failed to consider the range of

alternatives in managing common property resources in specific situations. These conventional models demonstrate only "what individuals will do when they are in a situation that they cannot change", but do not address "what individuals will do when they have the autonomy to craft their own institutions" (Ostrom, 1990: p.184).

According to Hardin (1978) the only alternatives to the commons dilemma were either "a private enterprise system", or otherwise "socialism". He referred to Hobbes' Leviathan to indicate that an external coercive force is necessary to avoid the tragedy of the commons. This leads to recommendations of complete control over natural resource by the central governments (Ophuls, 1973), or even the dictatorial governments (Heilbroner, 1974). Policy advice to centralize the control and regulation of natural resources, such as grazing lands, forests, and fisheries, has been widespread, especially in the developing countries.

Other policy analysts, influenced by these models, have recommended the imposition of private property rights when resources are owned in common (see Demsetz, 1967 and Johnson, 1972). Smith (1981), for example, suggests that the only way to avoid the destruction of natural resources is to dissolve the common-property system and install a private property system.

In short, the final solution of the commons dilemma is often a call for external force as the only way to escape the tragedy. This, on the one hand, can be materialized by a central authority that assumes continuing responsibility to make all decisions in resource use. On the other hand, an external authority may partition ownership rights of the resource and then allow individuals to pursue their own self-

interests with a set of well-defined property rights. Ultimately, both centralization and privatization advocates accept that institutional change must come from outside and be imposed on the individuals affected.

Ostrom (1990), an institutionalist, argues against the two contradictory solutions:

both are too sweeping in their claims. Instead of there being a single solution to a single problem, I argue that many solutions exist to cope with many different problems. Instead of presuming that optimal institutional solutions can be designed easily and imposed at low cost by external authorities, I argue that "getting the institutions right" is a difficult, time-consuming, conflict-invoking process. ... New institutional arrangements do not work in the field as they do in abstract models unless the models are well specified and empirically valid and the participants in a field setting understand how to make the new rules work. (Ostrom, 1990: p.14).

Instead of presuming that all individuals sharing a commons are inevitably caught in a trap with no way out, Ostrom (1990) argues that the capacity of individuals to resolve the various types of dilemma varies from one community to another. Instead of making policy on the presumption that the individuals are helpless and incapable, the institutionalists urge an examination of empirical evidence from various settings to find out why have some efforts to solve the commons problems failed, while others have succeeded? This experience will help develop a better theory of collective action that can identify the key variables influencing the capabilities of resource users to solve the problems of the commons.

Runge (1986) raised three key issues which make the conventional models unreasonable on empirical grounds:

First, its assumption of dominant free rider behavior leaves no place for cooperative rules unless they are imposed and enforced from outside. Second, the dominant strategy mechanism, by ruling out the importance of changing expectations of others' behavior, fails to capture the interdependence of decisions in a village economy. Third, by sidestepping the importance of mutual expectations in the formulation of individual strategy, it fails to deal explicitly with the problem of uncertainty regarding the actions of others (Runge, 1986: p.628).

These arguments raise questions over the theoretical approach, which are founded on the narrow view that free riding is a dominant strategy, that private property is the only way of optimal resource allocation, and that common property rules are incapable to resolve the problems of resource use in developing countries. It fails to consider a variety of institutional alternatives.

Policies based on metaphors, such as the tragedy of the commons and prisoner's dilemma, can produce outcomes that deviate substantially from those desired. For instance, nationalizing the ownership of forests in developing countries has been rationalized on the assumption that local villagers are incapable of managing forests so as to sustain their productivity and their value in preventing soil erosion (Blaikie, 1985). In many regions where local communities had owned and managed local resources by customary rules for generations, this nationalization had to be done by expropriation. In some of these countries, Thailand for example, the government agencies issued the regulations declaring the national reserve forests, but were unable to employ sufficient numbers of foresters to enforce these regulations, and often these regulations provided opportunities for officials to abuse the power. The consequence was that nationalization created "open-access resources" in local

communities where "common-property resources" had previously worked well.

To some extent, nationalization of local resources is simply a form of domestic colonialism and leaves decision making in resource use in the hands of distant bureaucrats who believe that the solution to deforestation is to pass a law prohibiting the cutting of the trees (Bromley, 1991). The undesired effects of nationalizing formerly local communal forests have been well documented for Thailand (Feeny, 1988b), Niger (Thomson, 1977; Blaikie, 1985; Thomson, Feeny, and Oakerson, 1986), and Nepal (Arnold and Campbell, 1986; Dani, 1986; Masserschmidt, 1986; Blaikie and Brookfield, 1987).

2.4 An Institutional Approach to Common Property Resource Management

In his seminal article, the "Tragedy of the Commons", Hardin (1968) feels that the inherent logic of the commons inevitably leads toward tragedy since natural science cannot provide sufficient technical solutions to deal with the commons problems. Nevertheless, he indicated a possibility to solve these problems once their nature is understood and social arrangements to manage the commons are developed. He realized that the search for solutions will require the development of social or institutional arrangements involving "mutual coercion mutually agreed upon" (Hardin, 1968: p.1247).

Institutional arrangements, in the context of resource management, are

defined as "the rules and conventions which societies establish to define their members' relationships to resources, translate interests in resources into claims, and claims into property rights" (Gibbs and Bromley, 1989: p.22). "Institutions", in general, are collective conventions and rules that establish acceptable standards for individual and group behavior, reducing individual uncertainty concerning the actions of others (Bromley, 1982). Institutions can be complexes of norms and patterns of behavior that persist over time by serving collectively valued purposes (Uphoff, 1986).

Institutions embody some kind of "collective action" in which the interests, resources, preferences, ideologies of many persons are brought together, and are reinforced by diffused benefits, legitimation, shared expectations, and rules (Bromley, 1982). There can also be penalties imposed for persons who violate institutional obligations (Arkadie, 1989). Institutions, in this manner, reflect the conventions that have evolved in different societies regarding the behavior of individuals in relation to the groups (Ruttan and Hayami, 1983).

Operationally, "institutions", according to Ostrom (1990: p.51), can be the set of working rules that:

determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals dependent on their actions.

All rules essentially contain prescriptions that forbid, permit, or require some action or outcome (Ostrom, 1986a). Institutions somehow help define organizations through laws and administrative decisions, which establish principles and guidelines for their

formation and conduct. Operational rules and procedures eventually become "institutionalized" after having served the needs and normative expectations of people over time (Uphoff, 1986). Organizations vary in their degree of institutionalization.

The terms *institution* and *organization* are often used synonymously. Three forms are usually recognized (Uphoff, 1986):

- (1) organizations that are not institutions;
- (2) institutions that are not organizations; and
- (3) organizations that are also institutions or *vice versa*.

Institutions in this study embraces all above combinations. In particular, *institutional arrangements* are defined as "property rights in watershed resources and the rights and obligations of individuals and groups"; and *organizational arrangements* are "the ordered groups of people who use watershed resources purposefully" (Gibbs, 1986: p.91). Organizations, as the structures of recognized and accepted roles, may exist in a formal or informal form. The latter has no legal basis to prescribe explicitly the roles and the authority and other resources associated with it.

When co-appropriators are dependent on a given local CPR as a source of economic activity as well as their livelihood security, they are jointly affected by almost everything they do. Each individual must take into account the choices of others when assessing his/her personal choices. These co-appropriators are tied together in a web of interdependence so long as they continue to share a certain CPR. The physical interdependence of CPR remains when effective institutional rules are in effect in the governance and management of the CPR; what changes is the

pattern of use and the outcome the appropriators obtain (Ostrom, 1990).

The problem facing CPR users is how to change the situation from one in which individuals act independently to one in which they adopt coordinated strategies to obtain higher mutual benefits or reduce their joint harm. This, however, is not necessarily to create an organization. Organizing is a process; an organization is the result of that process (Ostrom, 1990). The major tasks of organization involve changes that order activities so that sequential, contingent, and frequency-dependent decisions are introduced where simultaneous, noncontingent, and frequency-independent actions had prevailed in the use of a CPR (Figure 2.3).



Figure 2.3 Changes in decisions and actions in the use of CPR after institutional arrangements

Almost all organization is accomplished by setting a priority of activities that must be carried out in a particular order. This results in the contingent strategies which individuals can use in making decision to cooperate. They are willing to give up immediate returns in order to gain larger joint benefits when they observe others following the same strategy. Changing the positive and negative inducements associated with particular actions and outcomes and the level and types of information available can also encourage coordination of activities (Ostrom, 1990; Oakerson, 1992).

Unlike prisoners, most CPR appropriators are not confined to make decisions independently. However, to change from independent to coordinated or collective action is not an easy task. In some settings, the cost incurred in transforming a situation from one in which individuals act independently to one in which they coordinate activities can be very high, especially where the large groups of users are involved (Ostrom, 1990).

In this particular study, an institutional approach is adopted as a theoretical framework to analyze the management of watersheds as the commons, in the context of the local communities of Northern Thailand. The variables making up the conceptual framework include the physical attributes of watersheds themselves, socio-economic characteristics of resource users in the certain setting, existing decision-making arrangements, patterns of behavior of resource users, and outcomes and the consequences. The relationships of these sets of variables will be examined according to the guidelines stated in the conceptual framework in Chapter 4.

2.5 Public Choice Theory

Public Choice Theory is the application of theories derived from neoclassical economics, political science, and public administration. For geographers, the appeal of this theory lies traditionally in its presentation of the state as a rational provider of public goods (Johnston *et al.*, 1989). In fact, one premise of Public Choice Theory³ is to offer coherent and systematic knowledge about natural resource management

(Sproule-Jones, 1982). Public Choice can be defined simply as "the study of non-market economics, and the extension of the methodology of microeconomics to non-market settings" (Popkin, 1981: p.43). Since management of rural resources is concerned with the analysis and design of institutions other than markets, Popkin asserts that:

public choice can bridge the chasm between market economists applying rational models of individual decision making to markets and the social scientists who have assumed that the assumptions of economics about individual decision making and allocation of scarce resources were not applicable to their study of rural institutions. (Popkin, 1981: p.43).

Interest in public choice theory, or political economy according to Popkin (1981), as an approach to rural development problems, arises in part because it appears to offer a bridge between economic analysis and analysis based on social structure and power (Nicholson, 1981). In addition, public choice theory seems to provide a valuable insight into a specific set of development problems which are critical to the rural community. These problems include:

- (1) management of rural investment;
- (2) the development of local governance systems; and
- (3) access to, and management of, local resources.

These problems share several characteristics including: a substantial need for local participation; the presence of externalities and a degree of "publicness" in the goods and resources that suggests the need for collective action; an adequacy of existing institutions for decision making and management to deal with the problems of equity, demand, and free riders; and a strong tendency within the governments of developing

countries in favor of administrative solutions. These problems are a result of "the back of the invisible hand" labelled by Russell Hardin (1982), referring to Adam Smith's terms.

Before focusing on the relevance of public choice paradigm in CPR management at the local community, it is important to briefly consider the "hard core" concepts that form this theory.

2.5.1 Hard Core Concepts

Sproule-Jones (1982), applying Lakatos' research program⁴, systematically explicates the tenet of public choice theory as it is applied to natural resource management. He separates the public choice theory into three "hard core" concepts:

(1) *The nature of the goods*. An analysis of natural resource management takes into account four key related characteristics of resources. First, the type of resource as determined by its physical, chemical, and biological attributes, such as land, water, forest, fish, or minerals. Second, the abundance of the resource; uncertainty about the scarcity of resource has become a dimension of natural resource management. Third, the state-of-art technologies for appropriating and managing a resource; that is, the feasibility of making use of any natural resource is partly dependent upon available technology. Fourth, interdependencies among resources; the use of any one resource may create positive or negative impacts, or unknown consequences on the other resources and the environment.

Public choice theory conceptualizes these four critical dimensions of natural resources in terms of their "publicness" and their externalities. Interdependencies between natural resources are conceptualized as potential externalities.

(2) *Institutional arrangement.* In the public choice paradigm, institutional arrangements include the laws, regulations, and rules for making laws and regulations to enhance or constrain the individual behaviors as discussed in the previous section. Public choice analysis, using concepts developed initially in institutional economics, refers to such institutional arrangements as property rights, duties, and liabilities (Sproule-Jones, 1982).

Public choice analysis of natural resources evaluates alternative institutional arrangements for solving the problems of public goods, common pool resources, and externalities in the light of the potential net benefits that can accrue over time to resource users. Public choice analysis anticipates that alternative institutional arrangements for managing natural resources will involve transactions and coordination, and will be costly, and that the fundamental task of analysis is to compare alternatives among property right structures to find the most appropriate means to accommodate the variety of resource uses with respect to the nature of the resources. The range of local institutional options in natural resource management is discussed further by Uphoff (1986).

(3) *Individualism.* Public choice analysis assumes that decisions made in both public and private arenas are indeed made by individual members, individual public officials, or individual representatives of collective and corporate organizations.

Decisions made in society can always be disaggregated into decisions made by individuals alone or interacting with others. However, the decisions made by individuals are not simply determined by their preferences. Individuals make choices in the light of their own perceptions and incentives structured by institutional arrangements.

At this point, it becomes clear that the management of CPR intrinsically involves the hard core concepts of public choice theory. These three hard core concepts will be reconceptualized into the conceptual framework of this study, in Chapter 4.

2.5.2 The Composition of Theory

The key to comprehending the public choice theory is to understand the relationship among the hard core concepts when combined together to form this theory⁵. One must consider the nature of the good before drawing conclusions about associations between institutional arrangements and individual patterns of behavior. Furthermore, one must consider institutional arrangements to understand the relationship between individuals and goods, and one cannot understand this relationship without considering individual preferences (Sproule-Jones, 1982).

Sproule-Jones (1982) uses the river basin, as a bundle of resources involving multiple uses, to demonstrate the way that public choice theory analyzes CPR management. First, regarding the nature of the resource, public choice analysis uses

the resource system as a unit of analysis in which the boundaries of the resource may not coincide with the jurisdictional boundaries used by the political science analysis. Second, mainstream public administration often suggests that the solution to river basin management is by imposing a set of hierarchical organizational arrangements in the government, while the public choice analysis suggests the consideration of a variety of alternative institutions. Third, mainstream economic analysis based on the concepts of benefit and cost tends to recommend the market mechanism or privatization of resources. In contrast, public choice analysis contends that the property right structure in any community creates benefits and costs for different resource uses and produces different consequences, depending on the nature of resources and institutional arrangements.

Public choice is an evolving theory. Salazar and Lee (1990) have synthesized the property rights paradigm in economics with the public choice concepts and described their synthesis as "rational choice theory". Thus rational choice invites exploration of three kinds of questions. First, how does the nature of resources affect the development of institutional arrangements? Second, how do institutions affect individual decisions regarding resource provision and appropriation? Third, what are the social consequences of particular choices of resource use? These questions are compatible with the research questions of this study, and will be discussed.

2.5.3 Public Choice Theory and the Study of Peasant Collective Action

Many economic interactions in peasant society are non-market transactions involving cooperative activities. Thus to address such issue, two theories pertaining to collective action in peasantry - James Scott's moral economy approach (1976) and Samuel Popkin's political economy approach (1979) - will be discussed (more details in Brocheux, 1983; Feeny, 1983; and Keyes, 1983a). Both are based on empirical evidence from Southeast Asia. On many occasions, both Scott and Popkin refer to Thai peasant society from the studies of Embree (1950), Moerman (1968), and Potter (1976).

Scott (1976) uses evidence from Myanmar and Vietnam in portraying a collective behavior of the peasant, founded on the *norm of reciprocity* and *the right to subsistence*, risk-aversion (safety-first) strategies, and patron-client relationships. In contrast, Popkin (1979), focusing on individual decision making, argues that peasants may make risky investments (gambling), and also consider long-term as well as short-term investment logic.

The "moral economy" approach focuses on the relations between economic activity and social institutions. The moral economist argues that pre-capitalism peasantry does not have individual possession assumed to be created by capitalism when peasants are forced into market relations by the destruction of their pre-capitalism institutions. In the moral economy approach, markets are assumed to be a last resort for the peasants. The village is the key institution that provides them

with livelihood security assured by the "right to subsistence" in their village community.

The infringement of the peasant's institutions by the state and the capitalist creates the tensions which then lead to peasant involvement in rebellion and revolution: (Scott, 1976). The corporate village is responsible for the ownership and management of the communal resources. Nonmarket systems, based on ethics of reciprocity and patron-client relationship, are presumed to be more benevolent, humane, and reliable than market systems. Village redistributive mechanisms help reduce the pressure from the scarcity of resources, and reciprocal labor exchange helps relieve the labor shortage.

Scott (1976) points out that creation of the nation state and commercialization undermine peasant welfare, since they cause inequity and stratification and force the peasants into isolated individualism without the assurance and protection from their traditional institutions. Subsistence ethic, customary rights, and reciprocity are replaced with contracts, the market, and uniform regulations.

Popkin (1979; 1986), in his political economy approach, argues that the moral economy approach does not provide the procedures by which the norms governing behavior in the villages are derived, how conflicts among the norms are adjudicated, or how a subsistence level is decided. There is no consideration of conflicts between public and private means of assuring survival for peasants and no consideration of free-rider problems in the functioning of village institutions. In short, Popkin's political economy approach opposes to every thesis made by Scott's moral economy

approach.

Popkin (1986) argues that village resources and institutions are treated by peasants as collective goods, and that peasants apply the same investment logic to villages that they apply to the markets. The uncertainties of long-term dependence upon village institutions leads to a preference for private long-term investment and short run maximization behavior about village resources. Village norms are flexible regarding changes in the relative power of groups and individuals and are affected by strategic interactions within the village, particularly the free-rider problems. Favouritism and personal profit may influence the decision of the leaders to appropriate the resources for themselves.

However, Popkin (1981) maintains that peasants seek to achieve maximum livelihood security, not maximum profit, in their economic behavior. His political economy approach later seems to straddle both the role of institutions and the economic rationality of individualism. Popkin denies that rationality is merely self-interest (interest only in one's own welfare). He states that, in different times, peasants care about themselves, their families, their friends, and their villages.

The two approaches are founded on different basic assumptions about peasant behavior regarding economic activity, especially in response to the scarcity of communal resources and changes in the village influenced by outside forces (Hirsch, 1990b). Both yield useful insight for understanding the peasant behavior in changing society. In the context of collective action in Thai peasant society, studies in the villages of Northern Thailand by Moerman (1968) in Ban Ping and Potter (1976) in

Saraphi were set against the "loose-structure" model of Thai society proposed by Embree⁶ (1950) which influenced the interpretation of Thai peasant society for several decades.

According to Embree (1950: p.182), a "loosely-structured" social system means that the Thai, in contrast to the Japanese, allow considerable flexibility in individual behavior, place less importance upon observing reciprocal rights and duties, have "the almost determined lack of regularity, discipline, and regimentation." Unlike the Chinese, the Thai have no clear-cut system of duty and obligation in family relations. Embree states that Thai villagers, in contrast to those of Japan, have rights and duties that are less clearly defined, labor exchange systems that are "less closely woven", and village relationships do not emphasize long-term obligations (Embree, 1950 in Potter, 1976: p.1). In contrast to the westerners, the Thai have no respect for the laws and no sense of time. Both Moerman (1968) and Potter (1976) reject the loosely-structured paradigm and consider it unfitted to the Northern Thai peasants' behavior.

More recently, Hirsch (1990b), beginning his scrutiny based on the arguments outlined by Scott and Popkin, has observed changes in traditional cooperation of peasants in the northwest of Central Thailand. Hirsch raises one element of cooperation, that is, reciprocal labour (*Ao Raeng*)⁷. He focuses his study on the decline of this traditional cooperative activity affected by the penetration of the state via the process of "rural development" (Hirsch, 1989). Changes in the village community induced disruptions in the rationale for traditional cooperation and the

emergence of new forms of cooperation in response to change. Since cooperative practices require norms, mutual expectations, and even moral rules, they take time to become institutionalized. In the mean time, infringement of these traditional practices can quickly undermine established institutions (Hirsch, 1990b).

The expansion of the villages makes cooperation based on kinship or affinity difficult to establish on a village-wide basis. More fundamental changes, however, are driven by influences from external forces, in particular the state and market economy. Commoditization, debt, natural resource scarcity, and differentiation produce a change in production relations that makes traditional cooperation difficult to maintain by dyadic relationship. In particular, the decline of *Ao Raeng* can be attributed to these factors (Hirsch, 1990b). In response to changed conditions and outside influences, new forms of cooperation are emerging. Hirsch discusses the state-led rural development program, several forms of cooperative development, and an NGO program. These new forms all emphasize development through cooperation, however, from different perspectives. There has also been a sharp contradiction between an emphasis on individualism as the primary agent for community development and an appeal for cooperation in the specific programs.

Shigetomi (1992) has observed the changing aspects of cooperation in Thai peasant society through the impacts of the market economy as it has penetrated into the village community. By the "impact of the market economy", he means essentially that "each farming household as an economic unit increases the degree of its dependence on buying and selling of commodities" (Shigetomi, 1992: p.154). The

changes that occur from this impact are commonly seen when the people discard their reciprocal behavior and take up interactions transacted only via the market. In the case of Thailand in particular, significant consequences of the market economy are the disappearance of the abundant forests and the commercialization of labour.

With the rise of the market economy in rural areas, the village's natural resources become scarce because of overexploitation and commercialization. Competitive uses of local resources are intense while collective uses decline. Consequently, people no longer expect to receive from their fellow villagers the sorts of voluntary cooperation which they traditionally relied upon. In such an environment, cooperative activities formerly based on dyadic relationships have changed to those organized collectively by rules. In this new form of cooperation, the membership of the participants and beneficiaries is clear and well defined, and each member's actions are governed by regulations approved of collectively.

At the same time the impacts of the market economy have also changed the village community itself. Particularly, in Northern Thailand, Shigetomi (1992) states that the village has come to possess the natural resources needed for economic activities by claiming them as the CPRs. The village has spontaneously taken on the function of managing the newly-organized cooperative activities that use these communal resources such as watershed forests, headwater forests, sacred groves, and village woodlots. The new economic environment has brought about new forms of cooperation and organization bound together by principles which were different from those that underlay traditional cooperation.

As a result, the village community is being transformed into a "territorial organization" which has the responsibility to "maintain standards of behavior among all of the inhabitants within the territory in order to ensure their sustenance and economic productivity" (Shigetomi, 1992: p.162). Thus changes in the village's functions arise from the need to control communal resources.

In summary, the public choice paradigm provides a comprehensive framework for analyzing relationships between natural resources, institutional arrangements, and individual decision-making. It is specifically useful in dealing with decision making in peasant communities concerning common property resources. Two theories - Moral Economy and Political Economy approaches - underlie presumptions about collective action in economic activities in Thai peasant society, especially in the North. Recent empirical studies (e.g. Hirsch, 1990b and Shigetomi, 1992) also discuss the pace of change of cooperative activities in local communities. These will be discussed in detail in 8.3.

2.6 Framework for Institutional Analysis

To understand how individuals solve the problems of common property resources in a given community setting, one needs to translate the theory of institutions into a framework for institutional analysis. A theoretical framework helps analysts understand the general underlying mechanisms that function in different settings. When theoretical propositions and empirical observations are inconsistent,

adjustments in theory are necessary. In this study, theories affect the way that a problem is framed, leading to not only the particular assumptions used in an explanation, but also the specific questions to be asked and the possible answers the researchers may expect in conducting empirical inquiries.

Several of the presumptions that have framed the way that scholars have approached the analysis of collective action have led them to a pessimistic view of the ability of individuals to restructure their own interdependent situations. Ostrom (1990) remarks that they frequently presume that the underlying structure is always fixed, like that of a Prisoner's Dilemma game, and one level of analysis is sufficient. As long as CPR problems are conceptualized as collective-action problems, these same presumptions continue to frame the analysis leading to the fallacies of policy prescriptions mentioned earlier.

To build the framework for institutional analysis, Ostrom (1990: p.52) suggests that "it is useful to distinguish three levels of rules that cumulatively affect the actions taken and outcomes obtained by individuals in using CPRs." These three levels of institutional analysis and decision-making arenas are also useful in addressing institutional change.

- (1) *Operational rules.* These rules directly affect the co-appropriators in day-to-day decision-making concerning when, where, and how to withdraw resource units, who should monitor the actions of others and how, what information is needed, what rewards or sanctions will be assigned or imposed to different actions and outcomes.

(2) *Collective-choice rules.* These rules indirectly affect operational decision-making. These rules are used by appropriators, their officials, or external authorities in making policies about how a CPR should be managed.

(3) *Constitutional-choice rules.* These rules affect operational activities and outcomes through their effects in deciding who is eligible to use CPR and determining the specific rules to be used in framing the set of collective-choice rules that in turn affect the set of operational rules.

In short, the rules affecting operational choice are made within a set of collective-choice rules that are themselves made within a set of constitutional-choice rules (Ostrom, 1990). In the multi-layer settings, the constitutional-choice rules for a micro-setting are affected by collective-choice and constitutional-choice rules for larger jurisdictions. The linkages among these rules and the related level of analysis at which individuals make choices and take actions, including the processes of activities in each level, are shown in figure 2.4.

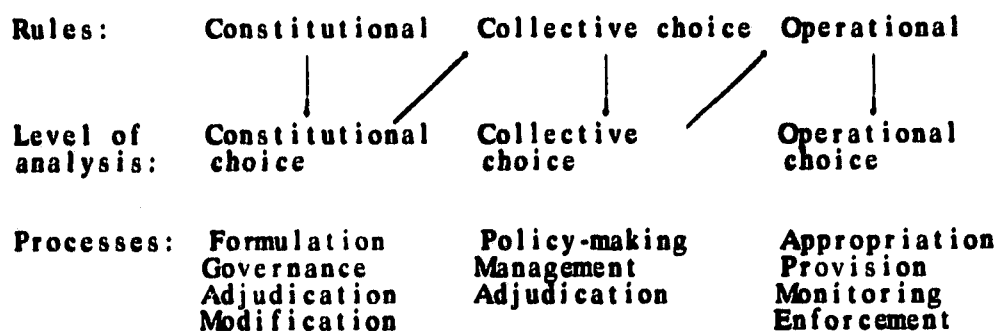


Figure 2.4 Linkages among rules and level of analysis (Ostrom, 1990: p.53)

Generally, when talking about a "rule" it is expected that most people affected by it know of its existence and mechanisms. In other words, operational rules are

more or less common knowledge and are monitored. By common knowledge, it implies that every participant knows the rules, and knows that others know the rules, and knows that they also know that the participant knows the rules (Ostrom, 1990).

Working rules may or may not be closely congruent with the formal laws that are expressed in legislation, administrative regulations, and court judgements. In many settings, formal law is usually a major source of working rules, particularly when conformance to them is actively monitored and sanctions for noncompliance are enforced. In many CPR settings, the working rules used by resource users may be totally different from legislative, administrative, or court regulations (Wade, 1988). In these cases, operational rules may assign the *de facto* rights and duties that are contradictory to the *de jure* rights and duties of a formal legislative system.

For the purposes of a particular analysis (i.e., short-run or cross-sectional analysis), analysts usually assume that some rules already exist and are static. However, the fact that they are held constant and unchanging during analysis does not mean that they cannot be changed. Yet, rules are changed less often than are the strategies that individuals choose within the rules. Changing the rules at any level will create uncertainty. Rules provide stability of expectations, and efforts to change the rules can rapidly reduce that stability. Further, it is usually true that operational rules are easier to change than collective-choice rules, and collective-choice rules are easier to change than constitutional-choice rules (Ostrom, 1990).

When doing analysis at any one level, the analyst keeps the variables of a higher level fixed for the purpose of analysis. But self-organizing users trying to cope

with the commons problems in the field settings go back and forth across levels as a key strategy for solving problems. Resource users with an absence of self-organizing and self-governing authority are trapped in a single-tier world. The best they can do is to adopt strategies within the given circumstances, like a prisoner.

At each level of analysis there may be one or more arenas of decision making. The concept of an "arena" does not necessarily mean a formal setting, yet does include such formal settings as legislatures and courts. An arena is simply the situation in which a particular type of decision/action occurs (Ostrom, 1986c). If resource users cannot change the operational rules themselves, then the only arenas for collective choice are external arrangements such as bureaucratic hierarchies, local or national legislatures, and judicial arenas.

The linkages between arenas and rules rarely involve a single set of rules. Most often, several collective-choice arenas affect the set of operational rules. Decisions made in national legislatures and courts concerning access to a particular type of resource are likely to affect the operational rules actually used in local settings. The relationships among formal and informal collective-choice arenas and the resulting operational rules are shown in figure 2.5. In the same manner, formal and informal constitutional-choice decisions may be made in local, regional, and/or national arenas.

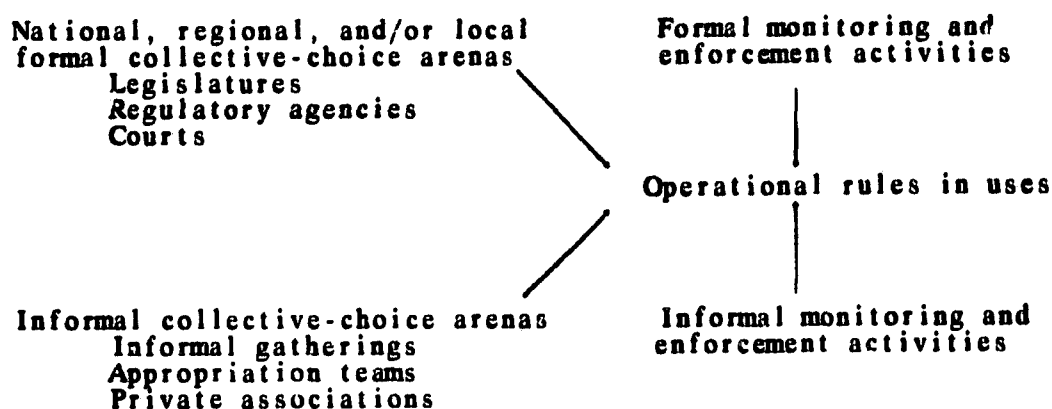


Figure 2.5 Relationships of formal and informal collective-choice arenas and CPR operational rules.(Ostrom, 1990: p.53)

To conduct an institutional analysis of CPR, Ostrom (1990) suggests analysts examine the following contexts. First, it is necessary to understand the physical structures of the resource such as its size, clarity of boundary, and other related attributes including the scarcity of the resource. Given the socio-economic circumstances of the resource users, how dependent are they on the resource, and what are the risks involved in various potential types of resource uses? Further questions must be asked about the key attributes of the individuals - how many are involved; are they involved in multiple activities together; are their interests roughly convergent or heterogeneous; have they established prior norms of behavior that can be used (or pose a disadvantage) in trying to solve CPR problems? Finally, the rules that resource users have devised, how they function, and how these affect the incentives of the participants must be examined.

The framework for institutional analysis presented in this section is similar to that used in Oakerson's (1986; 1992) model, and so that is incorporated into the

conceptual framework of this study which will be outlined in Chapter 4.

2.7 Delimiting the Local/Community Level

The "local" level is most frequently equated with the "community level." However, many kinds of collective actions are successful at a level below the community - kinship or neighbourhood groups - and others may be better organized by several communities together. Moreover, what is called a "community" may provide no substantial social basis for collective action. Rather it may be only a geographic entity labelled as a village or community by external arrangements for administrative purpose. According to Kemp (1991), "community" is often defined in two different ways. The first delimits quantitatively an areal unit in terms of a bounded locality, most obviously, a village community. The second focuses qualitatively on some distinctive attributes of behavior⁸. In practice both tend to overlap which, if insufficient care is exercised, can be a source of confusion.

By and large, the image of the peasant village community in developing countries remains one of a system of inter-connected and complementary relationships. A closely-woven group of people interact intensively with one another in all significant areas of life. This in turn creates and reinforces significant social boundaries, setting members apart from outside groups and from the higher level institutions of the wider society - the state. In this sense, the village is the key institution that provides the peasants with security (Scott, 1976). In contrast to

villages in Central Thailand, the village community in Northern Thailand, apart from its definite geographical unit, seems to fit in this qualitative definition in terms of the existence of cooperative activities and evidence of group formation (Potter, 1976; Shigetomi, 1992).

Delimiting exactly what is "local" is somewhat complicated. "Local" has different meanings depending on whether it is viewed from the perspective of an external agency or from the point of view of rural people themselves. According to Uphoff (1986: p.11), instead of defining rigidly at one level, he has ranged the "local level" within three levels of decision making (level 6,7, and 8) shown in figure 2.6. Above and below these levels, they are no longer considered as what should be described as "local" or "community". Household and individual levels are smaller units of decision making and activity, and they are not faced with the same problems of "collective action" as prevail at the group, community, and locality levels. At higher levels, qualitative differences arise because state authority and very large arenas of decision making and activity are involved.

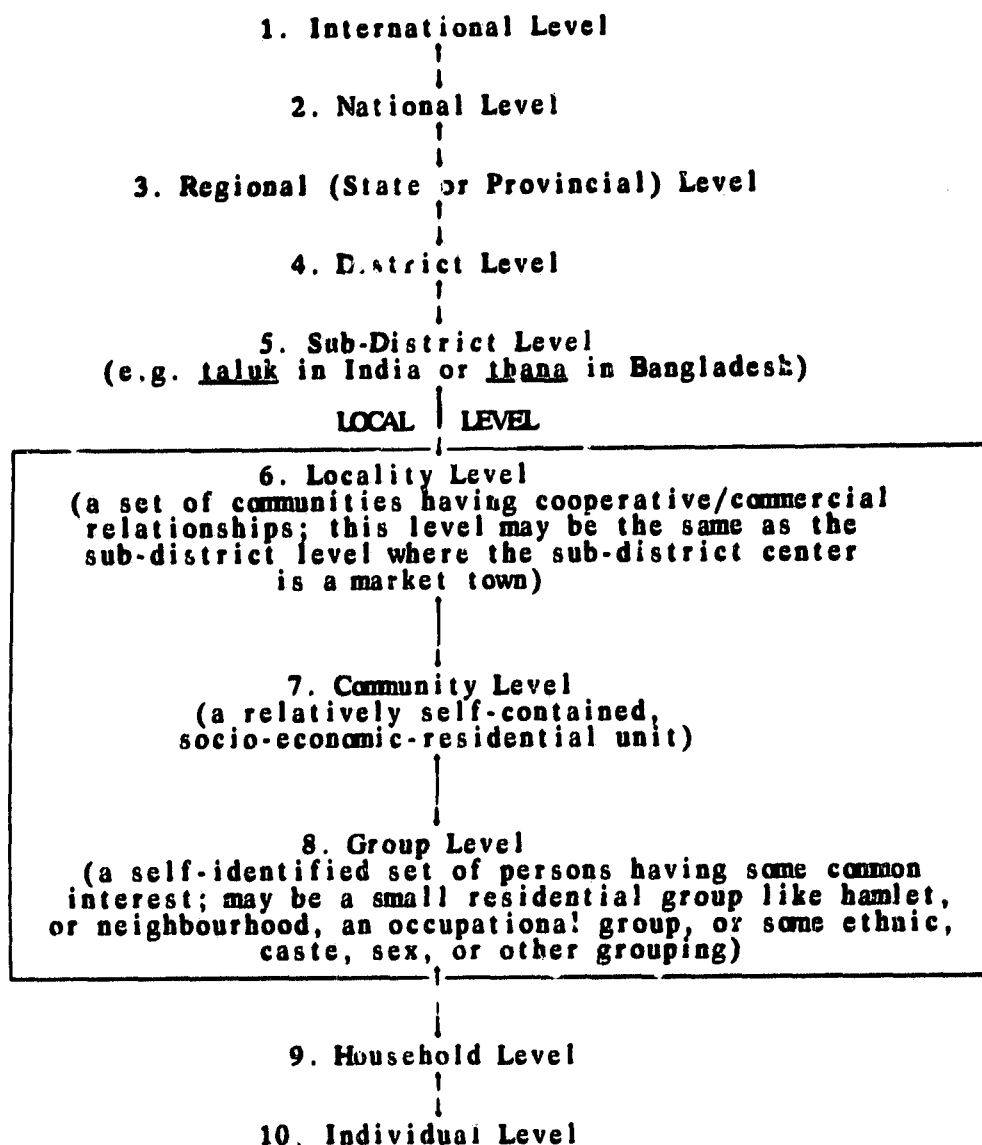


Figure 2.6 Levels of decision making and activity (Uphoff, 1986: p.11)

Drawing a definite boundary line is not important in itself in delimiting the "local" level. What is important, as indicated by Uphoff (1986), is to observe that people's perceptions of common interest and orientations toward collective action will change once the unit of decision making includes a significant number of "strangers". The basic characteristic of a "local" from a socio-economic perspective

is that most people within locality, community, or group tend to have face-to-face relationships and are likely to have multistranded connections (Uphoff, 1993). This provides a good foundation for collective action.

2.3 Some Empirical Evidence of Local Institutions in Common Property Resource Management

There is much evidence of local institutional arrangements in CPR management existing in various parts of the world. A number of empirical studies have been conducted in several types of CPRs by scholars from different disciplines, such as economics, political science, sociology, anthropology, human ecology, and geography, as shown in Table 2.1. Literature and empirical studies⁹ concerning common property resources have increased considerably since the milestone Conference on Common Property Resource Management was held from 21-26 April, 1985, followed by the initiative of the common property resource network which later developed to the International Association for the Study of Common Property (IASCP). In this section, however, only some of these cases are brought into discussion to demonstrate why some are successful, some failed, and some are in a fragile situation.

Table 2.1 Some empirical evidence of local institutions in common property resources

Type of resources and location	Sources
-The common lands in Japan -Swiss alpine meadows -Spanish irrigation -Zanjera irrigation in the Philippines -Turkish inshore fisheries -California groundwater basins -Sri Lankan fisheries -Indian irrigation -Sri Lankan water management -Nova Scotia small-scale fisheries -Maine lobster -Mexican pasture -The commons (land) in Botswana -Forest resource in Niger -Land rights in Thailand -Forests in Nepal -The commons in Tamil Nadu -Minor forest products in Indonesia -Resin tapping in Honduras	- McKean, 1986, 1992 - Netting, 1976; Stevenson, 1991 - Maass and Anderson, 1986 - Siy, 1982; Cruz, 1989 - Berkes, 1986, 1989 - Blomquist, 1989; Ostrom, 1990 - Alexander, 1982 - Easter and Palanisami, 1986 - Harriss, 1984; Uphoff, 1986 - Davis, 1984 - Acheson, 1989 - Wilson and Thompson, 1993 - Wynne, 1986 - Thomson, Feeny, and Oakerson, 1986 - Feeny, 1982 - Arnold and Campbell, 1986; Messerschmidt, 1986 - Blaikie, Harris, and Pain, 1986 - Jessup and Peluso, 1986 - Stanley, 1991

The first case is the management of the communally-owned alpine meadows, forests, and other related resources in Switzerland (Netting, 1972; 1976; Stevenson, 1991). Written documents since 1224 have provided evidence regarding the types of land tenure and transfers that have prevailed in the community and the rules used by villagers to govern five types of communally-owned property: the alpine grazing meadow, the forests, the "waste" lands, the irrigation systems, and the roads and paths connecting privately and communally-owned properties. The boundaries of the communally-owned lands were clearly established, and the outsiders were excluded.

Access to well-defined common property was strictly limited to citizens who were specifically assigned communal rights - the males. The rules written in 1517 to control the number of the cows sent to feed in the alp are still enforced, and impose substantial fines for any excessive share of grazing rights. The rules were administered by a local official who was authorized to levy fines on those who exceeded their quotas and to keep one-half of the fines for himself. This kind of rule is used by many other Swiss villages as a means for allocating appropriation rights to the commons.

The Alp associations are formed from elected members to manage the Alp, and are equipped with general legal authority. The Alp association has annual meetings to discuss general rules and policies and elect officials. The officials hire staff, impose fines for misuse of the commons, arrange for distribution of manure on the summer pastures, and organize the annual maintenance work, such as building and maintaining roads and paths. Labour contributions or fees for the use of the meadow are normally set in proportion to the number of cattle of each owner. Trees considered good enough for timber and wood for heating are marked by village officials and assigned by lot to groups of households, whose members then are authorized to enter the forests and harvest the marked trees.

All of the Swiss institutions governing communally-owned alpine meadows share one common aspect - the appropriators themselves make all major decisions about the use of the CPR. The co-owners are the main decision making unit. The user organization are also nested in a set of larger organizations (village, *Kantone*,

Bund) in which they are perceived as legitimate (Picht, 1987).

In another part of the world, the traditional common lands have been managed by local institutions in Japan for centuries (McKean, 1986). It is estimated that about 12 million hectares of forests and uncultivated mountain meadows were held and managed in common by thousands of rural villages during the Tokugawa period (1600-1867) and that about 3 million hectares are still managed as such today (McKean, 1992).

McKean provides the details of the rules, monitoring arrangements, and sanctions used for regulating the commons in three selected Japanese villages - Hirano, Nagaiki, and Yamanoka. The villages are situated on steep mountains similar to those of the Swiss Alps. Peasants cultivate their own private lands, growing rice, garden vegetables, and raise horses. The common lands in Japan provide a wide variety of valuable forest products, including timber, thatch for roofing and weaving, animal fodders, and decayed plants for fertilizer, firewood, and charcoal.

Traditionally, the household was the smallest unit of account, but the *kumi*, composed of several households, was frequently used as an accounting and distributional unit related to the commons. Each village contained a well defined, recorded number of households. A household could not subdivide itself into multiple households without permission from the village. Rights of access to the communal lands were accorded only to a household unit, not to individuals.

The village assembly created operational rules specifying in various ways how much of each valued product a household could harvest from the commons and

under what conditions. The written rules used in these villages, like those in Swiss villages, were crafted to each specific environment, to the particular economic roles that various forest products played in the local economy, and to the need to minimize the cost of monitoring, resource-unit outputs, and compliance with the rules. Villagers were required to perform collective work to enhance and maintain the yield of the commons.

Each village community also created its own monitoring and sanctioning systems. Most of the villages appointed "detectives" who daily patrolled the commons looking for unauthorized entry. In some villages, the detective was considered as one of the most prestigious positions for a young man (McKean, 1986). In other villages, all eligible males rotated into these jobs on a regular basis. One village that there was no formal detectives used a form of "citizen's arrest", and anyone was authorized to report rule breaking incidents.

The written codes designated a series of escalating penalties for various violations of the rules, depending on the past behavior of the offender. An occasional infraction would be handled by graduated sanction. For example, it was not uncommon for a detective to demand cash and *saké* from violators and to use that as his own rewards (McKean, 1986). Fines were graduated from low rates to extremely high rates to reflect the seriousness of the offense. The most serious punishment could be banishment from the village. McKean (1986; 1992) concludes from the long-term success of these locally-designed rules that it is not necessary for commons to be managed by regulations imposed coercively from outside.

Wade (1988), in his book *Village Republics*, offers a range of theoretical backgrounds and presents the conditions central to the collective action in the corporate village of South India. Wade began with a debate about the image of the Indian village based on Scott's pre-capitalist peasant society (Scott, 1976) and the argument against it by Popkin (1979). The corporate village is conditioned by the need to reduce risk and the scarcity of resources to achieve collective benefits which, by individual actions, could not be achieved. Wade focuses his study on irrigation and grazing lands in the nontypical *panchayat* village, namely Kottapalle. He states that the collective organization found in Kottapalle may not be able to be generalized and applied to other Indian villages but rather to identify the conditions in which the collective actions are likely to occur.

Wade (1988) concludes that the likelihood of successful organization depends on:

1. *The resources* - the smaller and more clearly defined the boundaries of the common-pool resources the greater the chances of success.
2. *The technology* - the higher the cost of exclusion technology (such as fencing) the better the chances of success.
3. *Relationship between resources and user group*
 - (i) Location: the greater the overlap between the location of the common-pool resource and the residence of the users the greater the chances of success.
 - (ii) Users' demands: the greater the demands (up to a limit) and the more vital the resource for survival the greater the chances of success.
 - (iii) Users' knowledge: the better their knowledge of sustainable yields the greater the chances of success.
4. *User group*
 - (i) Size: the smaller the number of users the better the chances of success,
 - (ii) Boundaries: the more clearly defined are the boundaries of the group, the better the chances of success.

- (iii) **Relative power of sub-groups:** the more powerful are those who benefit from retaining the commons, and the weaker are those who favour sub-group enclosure or private property, the better the chances of success.
 - (iv) **Existing arrangements for discussion of common problems:** the better developed are such arrangements among the users the greater the chances of success.
 - (v) **Extent to which users are bound by mutual obligations:** the more concerned people are about their social reputation the better the chances of success.
 - (vi) **Punishments against rule-breaking free riders:** the more the users already have joint rules for purposes other than common-pool resource use, and the more bite behind those rules, the better the chances of success.
- 5. Noticeability** - ease of detection of rule-breaking free riders: the more noticeable is cheating on agreements the better the chances of success. Noticeability is a function partly of 1, 3(i), and 4(i).
- 6. Relationship between users and the state** - ability of state to penetrate to rural localities, and state tolerance of locally based authorities: the less the state can, or wishes to, undermine locally based authorities, and the less the state can enforce private property rights effectively, the better the chances of success (Wade, 1988: pp.215-216).

Wade (1988), at the end, cautions that "there can be no presumption that the collective action route will generally work, any more than there can be a presumption that private property or state regulation will generally work" (p.216). Socio-economic changes in rural areas and increasing man/land pressures may lower the probability of cooperative solutions. Wade suggests that wherever a situation seems promising for collective action according the above presumptions the state should treat this option as seriously as the private property and state property options.

The state can help local institutions by providing a legal framework, and some technical assistance. The legal framework should facilitate the local institutions to obtain legally enforceable recognition of their own rights, and to be able to count on the state for the third-party solutions as the last resort (Wade, 1988).

Ostrom (1990) examines various cases of successful long-enduring, self-governing CPR institutions, including the common lands in Japan (McKean, 1986), the Swiss alpine meadows and forests (Netting, 1972; 1976), irrigation in the Philippines (Siy, 1982; Cruz, 1989), and irrigation in Valencia, Spain (Maass and Anderson, 1986). One similarity found in these cases is that all face uncertain and harsh physical environments. However, in contrast to the uncertainty of the environments, individuals in these communities have shared a past and expect to share a future by maintaining their reputations as reliable members of the community. A variety of norms have evolved in all of these settings that specifically define "proper" behavior. Many of these norms make it feasible for individuals to live in close interdependence without serious conflict.

In these successful cases, the resource systems have sustained their yields, and the institutions have remained robust where rules have been established and modified over time according to a set of collective-choice and constitutional-choice rules. However, the specific operational rules in these cases differ considerably from one another.

Ostrom (1990) constructs a set of seven attributes that characterize all of those robust CPR institutions, plus the eighth attribute used in the case of the larger and more complex CPRs. She refers to these attributes as "design principles" to mean "an essential element or condition that helps to account for the success of those institutions in sustaining the CPRs and gaining the compliance of generation after generation of appropriators to the rules in use" (Ostrom, 1990: p.90). These

principles are summarized as follows:

(1) *Clearly defined boundaries.* The boundaries of the CPR as well as the membership of the eligible users must be clearly defined because it is critical to distinguish the common property resource from the open access. This is a very first step in managing common property resources.

(2) *Congruence between appropriation and provision rules and local conditions.* The operational rules have to reflect the physical and technical attributes of the particular CPR and correspond to the specific conditions of the user community setting. For example, in the complex irrigation system, it is impossible for a single set of rules defined for all irrigation systems to deal with the specific problems in distinctive local settings.

(3) *Collective-choice arrangements.* The decision-making arena provides a chance for individuals to participate in modifying the operational rules. The CPR institutions characterized by this principle are able to adjust to local circumstances, because the individuals who directly interact with one another and with the resources can modify the rules over time so as to better fit them to the particular condition of the resources and the specific characteristics of their setting.

(4) *Monitoring.* In most cases, all co-users are expected to monitor the CPR conditions and detect the behavior of each other. The monitors, however, may be authorized by the decision makers to take responsibility for monitoring tasks.

(5) *Graduated sanction.* Appropriators who violate the operational rules are assessed graduated sanctions depending on the seriousness and context of offenses.

First-time offenders who are in desperate needs of the resources for subsistence are likely to get a lenient penalty. Serious and repeated offenses will be heavily sanctioned.

(6) *Conflict-resolution mechanisms.* When the conflicts in the user community could not be solved by the operational rules, related parties have rapid access to low-cost local arenas to resolve such conflicts. Local leaders are usually the primary conflict resolvers.

(7) *Recognition of rights to organize.* The local institutions established by resource users to govern the use of CPR are not challenged or dismissed by external arrangement of the state authorities.

(8) *Nested enterprises.* Almost all local institutions are organized in multiple layers of decision-making arenas such as local, regional, and national jurisdictions. All of the more complex, enduring CPRs meet this last design principle. Creating operational rules at the local level, without rules at the other levels, will produce an unstable system that may not last over the long run.

Although these design principles are drawn from a variety of empirical settings, they are still quite speculative so that further theoretical and empirical work is needed (Ostrom, 1990). Nonetheless, these design principles provide useful criteria for the examination of local institutions of community-based watershed management in Northern Thailand for this study. In turn, this study becomes another empirical setting to verify these design principles.

Not all CPR institutions are successful as will be seen in the following cases.

Berkes (1986) raises the case of two Turkish inshore fisheries - the Bodrum and the Bay of Izmir - where the fishers have failed to establish effective rules systems. Both areas suffer severe problems of overcrowding and rent dissipation. These CPR problems have been caused by a number of factors: e.g., the opportunities for short-term economic gain, the large number of fishers, the internal division of the fishers into distinct subgroups with conflicting interests, and the lack of higher level institutional mechanisms in which local rules and conflict-resolution mechanisms could be designed. There were no operational rules to allocate the fish, to reduce conflicts, or to limit the number of fishers. The general institutional setting within Turkey could be called "benign neglect" (Ostrom, 1990). National legislation required fishers to be licensed, but did not limit the number of licenses. Restrictions were placed on fishing during the spawning season and on the equipment that could be used. Efforts have been made to segregate inshore fisheries from offshore fisheries by prohibiting trawlers to fish within a three-mile offshore zone and within bays. However, none of these mechanisms has been enforced.

Another case involving fisheries is the fishing village of Mawelle in Sri Lanka (Alexander, 1977; 1982). Unlike the situation of Bodrum and the Bay of Izmir in Turkey where the fishers were unable to develop any effective rules to limit entry or the use of their local fisheries, the fishers in Mawelle had developed operational rules regulating access to the beach and the use of beach seines (Alexander, 1982). But, in practice, they were unable to maintain an entry rule controlling the number of the nets to be used. The problem is while some of the fishers tried to get local

officials to enforce the rule that limited the number of nets to be used, others were able to convince national officials not to enforce that rule. This case illustrates what happens in a dynamic local setting when appropriators do not have autonomy to make and enforce new rules.

The irrigation project in Kirindi Oya, Sri Lanka, illustrates the failure of farmers to develop an effective set of rules for organizing a large-scale irrigation system in a developing country. The lack of capacity to achieve self-governance appears to stem from internal factors in the farmer groups and external factors related to the regime structure under which they live. The internal factors include the large number of farmers involved, lack of attachment to the community, unequal distribution of the resources, and poor physical structures of the irrigation system. These problems are exacerbated by the politics of a central regime unwilling to enforce rules. The entire situation was worsened by the ethnic segregation between Tamil ethnics settled downstream nearby coastal areas and resettled Singhalese in the upstream areas (Uphoff, 1986).

Some CPR institutions are in a fragile situation. These local institutions still exist, however, facing uncertainty about their continuity and effectiveness. In terms of the design principles, the fragile cases have enough of the principles in use to enable appropriators to solve some of their immediate problems, but it may be difficult to predict institutional sustenance unless further institutional development is undertaken to meet the full set of design principles.

The cases of the fishing villages in Nova Scotia and Newfoundland of Canada

are used by Ostrom (1990) as examples of fragile institutions. For a long time, the fishers of these villages have developed their own rules governing the use of inshore fisheries (Davis, 1984). These local rule systems control who can enter the fishery and how local fishing grounds are divided among the fishers using different technologies. However, this local rule system is fragile because it is not recognized by federal authorities in Canada. The federal officials presume that the entire eastern coast fishery is open-access. They have considered that there are only two options available, i.e., private property rights and government regulation. They have adopted the latter.

Instead of strengthening locally evolved rule systems which had already been established to match local environments and technologies, Canadian government policy has been to create one standard set of legislations for the entire coastal areas. As a result, both the inshore and offshore fisheries have practically become open-access resources because the government cannot police the entire areas. Exclusions of illegal fishing and foreign vessels are almost impossible. Consequently, the fishing industries on the east coast of Canada are collapsing because the fish stocks have declined dramatically.

Ostrom (1990: p.177) describes the scenario of these fragile CPR institutions:

If national policies were to change, and the officials were to try to develop a set of nested rules that would help enforce the local regulations that have been developed over the years, while focusing most of the new regulatory effort on the far-offshore fisheries that are indeed open-access, then this fragile rule system could survive, adapt, and enable fishers to make effective use of this local resource indefinitely into the future. However, if Canadian authorities continue to try to develop a single policy for all fisheries along the entire

eastern coast, then eventual deterioration of the locally evolved system seems probable.

Perhaps one of the most frequently referred to examples illustrating the consequence of government intervention in local institutional arrangements is what occurred after the government of Nepal passed the Private Forest Nationalization Act in 1957 to nationalize the forest resources¹⁰. Many scholars have documented this incident, including Blaikie (1985), Arnold and Campbell (1986), Bromley and Chapagain (1984), Dani (1986), and Messerschmidt (1986). While the law was officially proclaimed to protect, manage, and conserve the forest for the benefit of the entire country, it, in turn, interrupted the locally-established system of communal control over the forests. When the law came into effect, the villagers began free riding and plundering the forest because they felt that they had no rights, only duties, and they did not trust the national government (Messerschmidt, 1986). In 1978, the government of Nepal deregulated the law and reversed its policy to recognize the rights of local communities in the control over forests which resulted in positive responses from the villagers in regard to reforestation efforts (Arnold and Campbell, 1986).

It is clear that empirical evidence of local institutional arrangements in solving CPR problems exists in many parts of the world. Although there are great variations in the conditions and factors contributing to successful cases of CPR management, some common aspects are shared among these cases. These characteristics includes a small size and clearly-defined boundaries of the CPR, close proximity of the resource, high dependency of the resources, small number and clearly-identified

membership of resource users, existing and enforceable rules in effect with sanction systems, more noticeability of rule-breaking, and less state interventions. The design principles devised by Ostrom (1990) are very useful for assessment and prediction of long lasting institutions as well as fragile institutions. These common characteristics and design principles, though speculative, can be used for further theoretical and empirical study, and will be used as such in this study.

Summary

This chapter has laid out the theoretical basis for this study by first examining the basic concept of property rights and property right regimes of the resources. The relationship between resource regimes and policy prescriptions for the governance of the resources has been discussed, especially the confusion between common property and open access. Theories and concepts of common property resources have been reviewed including the three conventional models, i.e., the Tragedy of the Commons, the Prisoner's Dilemma, and the Logic of Collective Action, and then the critiques and fallacies of these theories were examined. In response, an institutional approach to common property resource management has been established as the basis for the study of community-based watershed management. Public choice theory was introduced as an evolving paradigm to analyze the relationships between the nature of the resource and the institutional arrangements, and the individual decision making, in the context of the peasant community. The locality level was defined to

help identify the communities to be selected for this study. Finally, the empirical evidence for local institutional arrangements in CPR managements were examined to demonstrate why some cases are successful, why some are in a fragile situation or even failed. The shared conditions and factors contributing to the successful cases were categorized to use in predicting the institutional endurance.

From this more abstract level I will turn to a description of where the actual field research took place. Chapter 4 will then seek to bridge the abstract and the concrete by outlining the conceptual framework and research design for the study. In so doing, relevant concepts reviewed in this chapter will be reconceptualized and put together by using Oakerson's (1986; 1992) framework for analyzing the commons as the guidelines.

Notes

1. Stevenson (1991: p.40) identifies seven categories that constitute a set of necessary conditions for common property: (1) the resource unit has bounds that are well defined by physical, biological, and social parameters; (2) there is a well-delineated group of users, who are distinct from persons excluded from resource use; (3) multiple included users participate in resource extraction; (4) explicit or implicit well understood rules exist among users regarding their rights and their duties to one another about resource extraction; (5) users share joint, nonexclusive entitlement to the *in situ* or fugitive resource prior to its capture or use; (6) users compete for the resource, and thereby impose negative externalities on one another; and (7) a well-delineated group of rights holders exists, which may or may not coincide with the group of potential users.

2. Ostrom (1990) uses the term *appropriation* for the process of withdrawing resource units from a resource system and the term *appropriators* for those who withdraw such resource units - or simply the users. She also uses the term *providers* to refer to those who arrange for the provision of a common pool resource (CPR) and uses the term *producer* to refer to anyone who actually constructs, repairs, or takes action that ensure the long-term sustenance of the resource system itself.

3. There are communities of scholars who view conceptual, cultural, economic, ethical, and political considerations as being closely linked in configurations of relationships that are constitutive of human societies and affect potentials for better living conditions. The work of these scholars is variously referred to as studying *public choice*, the *new institutional economics*, *transaction-cost economics*, *institutional analysis and development*, and the *new political economy* (Ostrom, Feeny, and Picht, 1988).

4. Imre Lakatos (1974), an historian of science, argues that scientific paradigms or research programs consist of two parts: The first, the negative heuristic, comprises the basic assumption and auxiliary hypotheses which are accepted as a permanent hard core, not subject to falsification by empirical testing. The second part, the positive heuristic, is composed of the guidelines, suggestions, and supplementary hypotheses that develop the empirical and analytical range of the research program. The positive heuristic is subject to empirical verification, unlike the negative heuristic. Lakatos developed the notion of a negative and positive heuristic in research programs in the context of a still ongoing debate on the growth of scientific knowledge and its problems of verification and confirmation.

5. Sproule-Jones (1982) described the kinds of conclusions about natural resource management which would be reached if each hard core were missing from the theory: "Were the hard core to delete the nature of the good, the conclusions would fit mainstream political science. Were individual preferences to be deleted,

mainstream public administration would ensue. And were institutional arrangements to be deleted, mainstream economics would be the result." (Sproule-Jones, 1982: p.795).

6. Embree (1950) portrays Thai society from study of an atypical Thai community, Bang Chan, located on the outskirts of Bangkok. Bang Chan is not typical in terms of geographical, historical, political, and ethnical aspects.

7. This traditional reciprocal relationship is relatively common in rural areas of Thailand. The reciprocal activities are dominant in farming work, however, they may include house building, household rituals such as wedding, funeral, and other activities that need to pool labour. This reciprocal relationship is best known in Thai as *long khaeg*. In the North, however, it is known as *ao mou*. The cooperative labour exchange in *long khaeg* is also the mutual exchange of a willingness to help fellow villagers voluntarily. Thus this reciprocal relationship could be appropriately called "obligatory voluntaryism" (Shigetomi, 1992).

8. The qualitative approach has a long history but is most frequently referred to the distinction drawn in 1887 by Ferdinand Tönnies between community and society, *Gemeinschaft* and *Gesellschaft*. In agrarian society, the quality of *Gemeinschaft* has been especially associated with the village community with a tendency to emphasize the wholeness of village culture, a lack of social differentiation and the internal integration of its relations (Kemp, 1991).

9. See Fenton Martin (1989; 1992) *Common Pool Resources and Collective Action: A Bibliography*. Vol.1 and 2, Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis.

10. Dani (1986) describes the incorporation of forests in Nepal as the process of annexation that caused alienation within watershed communities as they had lost control over local resources.

Chapter 3

The Study Sites

3.1 Geography of Northern Thailand

Although this study focuses on specific communities, it is necessary to provide the regional backgrounds. Northern Thailand is also distinct from other parts of the country and deserves some attention, especially in terms of its physiography, history, people, and culture. Therefore, the geographical context of Northern Thailand is explored in this section.

3.1.1 Topography

Northern Thailand consists of two topographic regions -the northern mountains and valleys, and the Upper Central Plain (Figure 3.1). It covers an area of 170,000 square kilometres or one-third of the country's land area. The northern ranges and valleys occupy the area above 18° N latitude. The five main parallel ranges running north-south and the valleys between them provide the catchment and headwaters of four major tributaries of the Chao Phraya River - the Ping, Wang, Yom, and Nan rivers that drain southward. This is the major water resource of Thailand, feeding the rice bowl of the Central Plain. To the north of the Phipannam

Divide are basins that drain into the Mekong River - through the Mae Kok and Ing rivers in Chiang Rai. And to the northwest corner of the region are the Pai and Yuam rivers in Mae Hong Son, and Moei river in Tak that originate on the southern and western slopes of the Phipannam range that feed into the Salween River of Myanmar.

Between these ranges of the North are valleys and several inter montane plains at different altitudes from 150 metres to 380 metres above mean sea level (MSL) that provide agricultural land and area for settlements. The North may not have the heaviest rainfall in the country, but with its physical landforms and healthy forest cover, the soil water is high and soil productivity is above average for the country (Arbhabhirama *et al.*, 1988).

Northern Thailand is comprised of 17 provinces (*Changwat*). Geographical and socio-cultural characteristics divide Northern Thailand into the Upper North and the Lower North (Figure 3.2). The Upper North covers an area of 100,474 square kilometres, or 59 percent of the North. The topography of the Upper North can be divided into three major zones:

- (1) the *lowland*, an area with slopes less than 5 percent and the elevation less than 300 metres MSL, with an area of 5.9 million rai, or 9 percent of the Upper North;
- (2) the *upland*, an area with the slopes from 5 to 35 percent and elevation from 300 to 600 metres MSL, with an area of 19.6 million rai, or 30 percent; and

(3) the *highland*, an area with slopes more than 35 percent and elevation more than 600 metres MSL, with an area of 40.2 million rai, or 51 percent.

The Upper North is comprised of 9 provinces: Chiang Rai, Chiang Mai, Lampang, Lamphun, Mae Hong Son, Phayao, Phrae, Nan, and Tak. Chiang Mai, the second largest city of the country, is the center of the Upper North.

The Lower North covers an area of 69,532 square kilometres, or 41 percent of the North. Most of this area is flood plain, with socio-economic and cultural characteristics similar to those of the Central Region. The Lower North is comprised of 8 provinces: Kamphaengphet, Nakhon Sawan, Petchabun, Phichit, Phitsanulok, Sukhothai, Uthai Thani, and Uttaradit. Phitsanulok is the center of the Lower North.

In this study, The North is exclusively specified as the Upper North for the reason of its distinguished geography, socio-economic and cultural characteristics. Any kind of generalization implicated, if not specifically articulated for the whole North, is deemed to mean the Upper North.

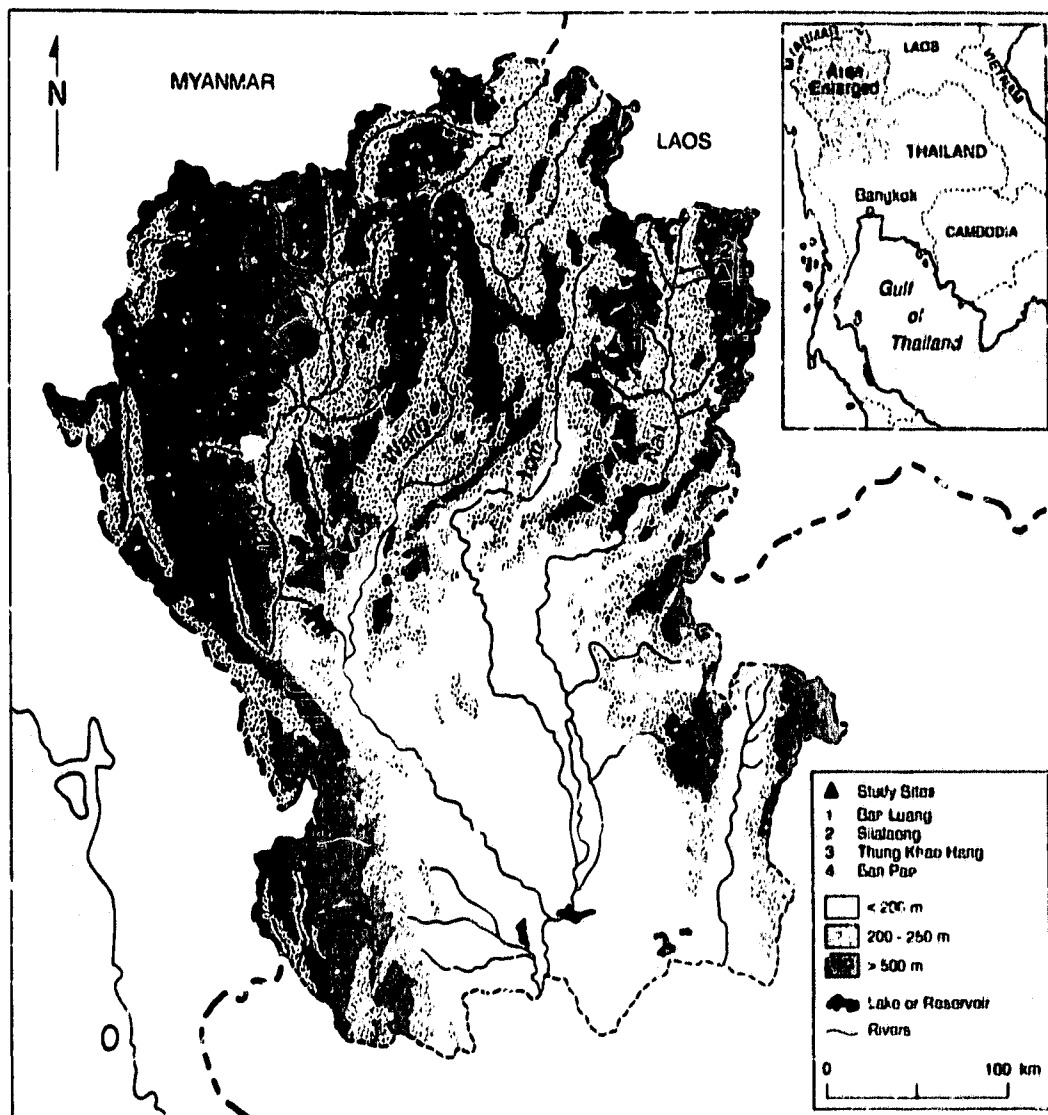


Figure 3.1 Topography of Northern Thailand

Source: Israngkura and Chulasai, 1990

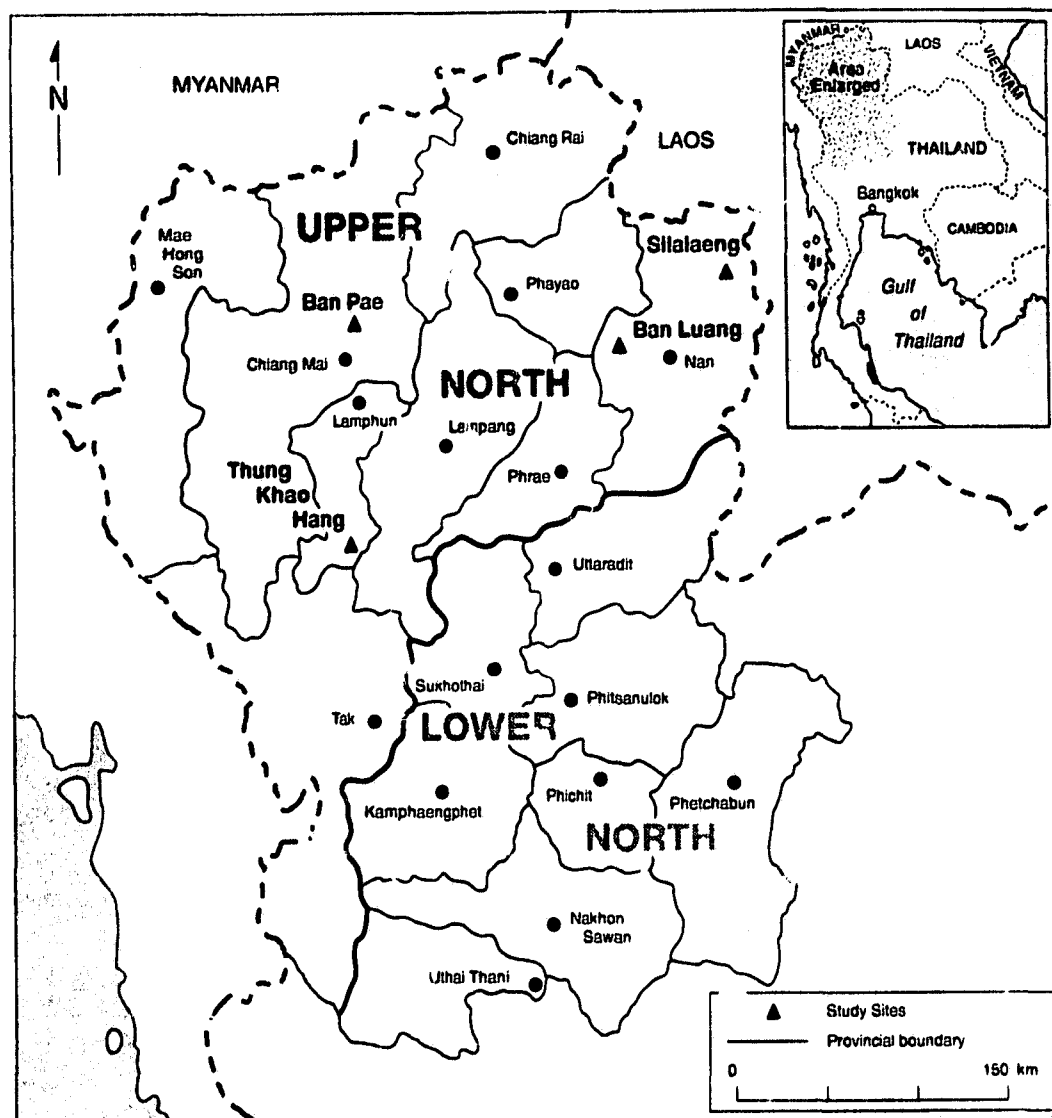


Figure 3.2 Administrative boundaries of Northern Thailand and location of the study sites

Source: Israngkura and Chulasai, 1990

3.1.2 Climate

The climate of Thailand, in general, is tropical. In the North, the southwest monsoon carries moisture from the Indian Ocean giving a wet season normally beginning in mid-May through mid-October with the peak in August. However, there are some variations in different locations in terms of the actual annual rainfall and its year-to-year fluctuations.

During mid-October to mid-February, the northeast monsoon brings in dry and relatively cold air from China and Siberia. It causes a dry and cool season - so called winter in this region. It is significantly colder in the Upper North with the average minimum temperature at 10 degree celsius. The coldest temperature in January recorded between 1951 and 1980 was 0.1 degree celsius (Abhabhira *et al.*, 1988). Frost has been reported during the winter especially at elevations above 1500 metres.

The switch-over or inter-monsoon period, from mid-February to mid-May, coincides with the sun moving northward across the equator. Increased heat absorption by the land mass and little rain produces a very hot climate. The range of mean maximum temperature will be 33-38 degree celsius. The highest-ever temperature in April between 1951 and 1980 was 44.5 degree celsius.

Growing seasons for rain-fed areas in the uplands depend largely on rainfall pattern. The first crop of the year is sown before the annual rain in late April, and the last crop finishes on residual moisture after the rain stops in October. In irrigated

areas, the growing season is extended all year round. Irrigation is almost always assured downstream from large catchment areas.

Climatic conditions in the mountains differ from the lowlands. Throughout the year temperature is lower, especially at night. Because of this, cultivation of temperate crops is also possible at higher elevations. Rainfall is, in general, heavier at higher elevations, but one side of a mountain may receive much more rain than the other (Van Der Meer, 1981). The average rainfall in the Upper North over 35 years (1951-1985) was 1,208 millimetres with an average of 119 days of rain. The average rainfall of the country in the same period was about 1,600 millimetres (NESDB, 1992).

Although the general pattern of the monsoon rain is regular, precipitation may be spotty and the onset of the rains is uncertain, varying by as much as a month or more (Smitinand *et al.*, 1978). Every three to five years rainfall may be so extreme that crops are damaged because of floods or drought (Table 3.1).

Table 3.1 Rainfall in the Upper North of Thailand, 1983-1987 (unit: millimetre)

Provinces	1983	1984	1985	1986	1987
Chiang Mai	1022.9	783.8	1225.7	984.2	1144.5
Chiang Rai	1786.6	1576.4	1935.6	1473.4	1243.6
Lampang	1159.3	873.6	866.5	1059.1	1092.7
Lamphun	933.9	831.3	1064.4	871.5	1237.4
Mae Hong Son	1097.1	1407.4	1342.5	1254.4	1063.6
Nan	1291.9	1332.9	1191.2	985.9	900.1
Phayao	1155.1	885.3	1009.1	945.3	1137.2
Phrae	810.1	1180.9	1289.8	1135.0	1077.7
Tak	1368.5	972.4	1111.7	1094.4	978.5
Total	1180.6	1093.8	1226.2	1089.2	1097.3

Source: Israngkura and Chulasai, 1990.

3.1.3 Soils and Land Use

Mountain soils are generally dominated by red-brown podzolic soils and reddish brown lateritic soils. The soils near the rivers are alluvial, poorly drained and clayey, with high to moderate fertility. Common to all valleys are old alluvium, red-yellow podzolic soils. Gray podzolic soil on old alluvium is scattered in the plains. Red-yellow podzolic soils on residuum and colluvium, formed from acid rocks, and of low fertility are occasionally found along the foothills (Smitinand *et al.*, 1978).

In the Upper North, there are 6,249,174 rai suitable for paddy (10 percent of

land area), 9,615,575 rai suitable for upland crops (15 percent), 10,399,317 rai unsuitable for agriculture but can be used for special crops if appropriate measures are taken (16 percent), and 37,647,752 rai of mountain soil (59 percent, Table 3.2). Agricultural land uses including paddy, upland cropping, orchard accounted for 10,477,424 rai in 1988. An average agricultural land holding size is 14.26 rai per farmer household (Table 3.3).

Table 3.2 Percentage of soil suitability in the Upper North

Provinces	Total area (rai)	Paddy soil	Upland soil	Unsuitable soil	Mountain soil
Chiang Mai	12,566,911	10	10	5	75
Lampang	2,816,176	10	30	25	35
Lamphun	7,833,726	10	30	30	30
Mae Hong Son	7,925,787	0	5	10	85
Tak	10,254,156	5	10	15	70
Chiang Rai	7,298,981	20	20	10	50
Phayao	3,959,412	30	15	20	35
Phrae	4,086,624	10	15	35	40
Nan	7,170,045	5	15	20	60
Total	63,911,818	5	15	16	59

Source: Northern Development Center, NESDB, 1992.

Table 3.3 Agricultural land use areas and land holding size in 1988

Provinces	Agricultural land use (rai)	Farmer households	Average land Holding (rai)
Chiang Mai	1,627,527	167,391	9.72
Lampang	1,386,800	107,497	12.90
Lamphun	574,074	58,316	9.84
Mae Hong Son	227,789	21,618	10.54
Tak	961,291	38,918	24.70
Chiang Rai	2,586,230	146,576	17.64
Phayao	1,162,700	69,482	16.73
Phrae	859,834	56,534	15.21
Nan	1,091,184	68,396	15.96
Total	10,477,429	734,728	14.26

Source: Northern Development Center, NESDB, 1992.

3.1.4 Forest

The forest types of Northern Thailand are classified into two main categories, evergreen and deciduous, each with further subtypes associated with differences in altitude, soil, rainfall, and landform (Smitinand *et al.*, 1978).

- (1) *Evergreen forests.* There are three types of evergreen forests: the lower montane, coniferous, and dry evergreen forests.
- (2) *Deciduous forests.* The deciduous forests are of three types: moist mixed deciduous, dry mixed deciduous, and dry deciduous dipterocarp forests. Mixed deciduous forests have great economic value with many

commercial species including teak (*Tectona grandis*).

In 1989, the North had a forest area of 50 million rai or about 55.5 percent of 90 million rai of the forested area of the country. However, during the period 1982-1989, the forested area in the North was reduced from 54.8 million rai or 51.7 percent to 50 million rai or 47.3 percent of the total area of the North. For the Upper North, in 1989 the forested area remained 61.6 percent of the total area of this sub-region. From 1982-1989, the forest areas were encroached at a rate of 426,876 rai per year (Table 3.4).

Table 3.4 Forest area and percentage of total area of the Upper North and the encroached areas during 1982-1989

Provinces	1982		1989		Average per year
	rai	%	rai	%	
Chiang Mai	10,438,750	83.1	9,481,250	75.4	136,786
Lampang	5,903,125	75.4	5,482,500	70.0	60,089
Lamphun	1,701,250	60.4	1,591,875	56.5	15,625
Mae Hong Son	6,023,750	76.0	5,766,875	72.9	35,268
Tak	7,961,250	77.6	7,798,125	76.0	23,304
Chiang Rai	3,024,375	41.4	2,694,375	36.9	47,143
Phayao	2,048,750	51.7	1,726,875	43.6	45,982
Phrae	1,716,250	42.0	1,593,750	39.0	17,500
Nan	3,509,375	48.9	3,193,125	44.5	45,179
Total	42,326,875	66.2	39,338,750	61.6	426,876

Source: Royal Forestry Department, 1992

3.1.5 Population

In 1991, the population in the North was about 11.0 million or 19.6 percent of the national population. The Upper North has a population of 5.6 million, constituting 50.8 percent of the total population of the North. Chiang Mai province with a population of 1.4 million has the largest population in the North and Mae Hong Son, with a population of 174,777, the smallest (Table 3.5).

Table 3.5 Population, population density, and growth rate of the Upper North in 1991

Provinces	Population	Persons/sq.km.	Growth rate (%)
Chiang Mai	1,382,136	69	0.89
Lampang	775,812	62	0.86
Lamphun	419,633	93	0.83
Mae Hong Son	174,777	14	1.76
Tak	356,342	22	1.89
Chiang Rai	1,043,423	89	1.10
Phayao	505,359	80	0.84
Phrae	494,129	76	0.32
Nan	451,485	39	1.46
Total	5,603,096	55	1.00

Source: Department of Local Administration, 1991

The population density of The North is 65 persons per square kilometre (55 for the Upper North and 81 for the Lower North) according to 1991 statistics (Department of Local Administration, 1991). Most of the population is concentrated in the valleys along the main rivers. In the Upper North, Lamphun has the highest population density of 93 persons per square kilometre. Mae Hong Son has the lowest, with 14 persons per square kilometre.

In the first half of the 1980s the annual average growth rate of population was about 1.6 percent in the Upper North and 1.5 in the Lower North. From 1988-1991 the annual growth rate of population was 1.00 percent in the Upper North and 0.87 in the Lower North (Table 3.5). The population growth rate of the North is lower than the average of 1.6 percent of the country and the lowest in comparison with other regions. Average household size in the Upper North is 4.7 persons. About 24 percent of the population reside in the cities and the market centers, and 76 percent live in the rural areas.

Culturally and historically, the people who are considered truly "northerner" or *Khon Muang* are only people of *Lanna*, i.e. Chiang Mai, Chiang Rai, Lampang, Lamphun, Phayao, Phrae, Nan, and Mae Hong Son. The Northern Thai or *Khon Muang* dominate the population of the Upper North. They call themselves *Khon Muang*, which literally means "town people" in order to differentiate themselves from the Central Thai (*Khon Thai*) as well as from the *Khon Doi* or "hilltribes". They form about 80 percent of the total population. They speak a distinctive northern dialect or *Kham Muang*¹, which is slightly different from Central Thai language. Nonetheless,

they usually understand the Central Thai language - an official language used in school, government administration, and the mass media.

The ethnic composition of the North is complicated by the presence of a variety of ethnic minorities. The hilltribes, mainly living in the higher elevations, include Karen, Hmong, Yao, Lisu, Lahu, Akha, Lua, Khamu, H'tin, and Mabri. Karen is the largest ethnic minority living both in the lowlands and the hills, and practicing both irrigated wet rice farming and shifting cultivation. Lua live in similar environments as Karen and have a similar economy, as do many Khamu and H'tin. Hmong, Yao, Lahu, Lisu, and Akha reside mostly in the mountains and practice shifting cultivation. Their main subsistence crops are rice and maize. Many were involved in opium growing. Nowadays, they grow opium-replacement cash crops such as cabbage, and some temperate crops and fruit trees introduced by the highland development projects. In 1989 the population of these hilltribe minorities in the North was 522,784, according to the statistics of the Tribal Research Institute (NESDB, 1992).

3.1.6 Political Economy of Northern Thailand

Northern Thailand hereafter refers specifically to the Upper North or the so-called *Lanna* in the historical and cultural sense. Lanna maintained its status as an independent state for the long periods of time. Throughout history, Lanna independence was dependent on the rise and fall of the hegemony of either Siam or

Burma. Lanna had been the vassal state of Burma since 1556. In 1775, it was liberated by Chao Kawila of Lampang with the help of King Taksin of Siam (Vaddhanaphuti, 1984). Since then it has been a tributary state of Siam. However, the northern princes (*Chao Muang*) retained their power in most ruling affairs with minimal interference from Siam; except they had to pay triennial tributes to Bangkok to show their loyalty.

Realizing the increasing threat from British colonization in the second half of the 19th century, the Bangkok government began to increase its control over the North by introducing reforms during King Chulalongkorn's reign (1868-1910) which reduced the power of the *Chao Muang*. By 1896, ownership rights over the forest resources were transferred from the control of *Chao Muang* to the Bangkok administration under the management of the newly-established Royal Forestry Department (RFD). Watershed forest areas have been under the state-property regime ever since. The incorporation of Northern Thailand was rationalized as a response to external threat from colonization as well as an urgent demand to modernize the nation-state initiated by King Chulalongkorn.

The incorporation, however, was not without some resistance from the local people. The infringement by the Siamese state in the form of taxation brought about peasant rebellion such as the case of the Phaya Phab rebellion (known as *Khabod Phaya Phab*) in Chiang Mai. This resistance in turn resulted in more forms of control from Bangkok including administration, education, communication, and even religion. Sangha administration was united to be under the Sangha council in Bangkok. The

incorporation enabled the Bangkok government to extract the natural resources from the North more efficiently, especially the teak.

By the time Thailand changed from absolute monarchy to constitutional monarchy after the Revolution 1932, Northern Thailand had been virtually incorporated into the Thai nation politically and economically. Although it still remains its cultural identity, the North has been increasingly penetrated by the Thai nation-state as well as the market economy ever since.

During the first half of the 20th century, Northern Thailand's economy was mainly based on the production of glutinous rice, teak, *miang* (fermented tea leaf), and tobacco (Vaddhanaphuti, 1984). Surplus rice was traded only in the regional market. The improvement of railways and roads that linked the North to Bangkok has on the one hand accelerated the incorporation of Northern Thailand's economy to the national and world market (Feeny, 1982). On the other hand, it has facilitated the penetration of the state authority and the market economy into the North, firstly into the cores and gradually into the peripheries.

Agriculture is the most important economic base of the North. However, the importance of the agricultural-based sector has recently declined when compared with other sectors. The proportion of agriculture to total gross regional product (GRP) decreased from 38 percent in 1982 to 33 percent in 1989 while other sectors increased (NESDB, 1992). This declining pattern indicates that the expansion in agriculture in the North has currently been stalled because of the limited land and other related resources. In the crop year of 1987-1988, the North accounted for 28

percent of the country's rice production, 80 percent of mungbeans, 73 percent of soybeans, 57 percent of groundnuts, 52 percent of cotton, 47 percent of sorghum, and 43 percent of maize (Israngkura and Chulasai, 1990).

The average per capita income in the North is the second lowest after that of the Northeast, and it is much lower than that of the entire country. In 1989, the average per capita income of the whole North was 18,928 baht compared with 32,028 baht for the whole country. Per capita income varies considerably among the provinces in the Upper North (Table 3.6).

Table 3.6 Per capita income of the Upper North at the market price, 1985-1989
Unit: Baht

Provinces	1985	1986	1987	1988	1989
Chiang Mai	15,700	17,043	18,683	21,549	24,727
Lampang	15,367	15,417	17,124	18,999	21,039
Lamphun	10,254	10,295	12,745	13,263	15,861
Mae Hong Son	12,976	12,798	13,455	15,291	16,296
Tak	15,802	16,868	20,030	28,305	22,934
Chiang Rai	10,477	11,564	13,339	14,833	16,928
Phayao	8,825	9,662	12,057	12,915	14,044
Phrae	10,090	10,406	11,196	12,634	14,373
Nan	9,356	9,727	10,513	11,931	13,338
The North	12,536	13,284	15,013	17,198	18,928
The Country	19,627	20,803	23,377	27,632	32,028

Source: Northern Development Center, NESDB, 1992.

In summary, this section has attempted to present the geographical context of the Upper North as a distinct region with three geo-ecological, altitudinal, and cultural zones (Uhlig, 1980). These three distinctive zones are described by Uhlig (1980: p.33) as follow:

- (1) a zone of predominantly sedentary wet-rice cultures with a relatively well developed infrastructure in the valley and intra-montane basins;
- (2) a zone of intermediate elevation with a mixture of land rotation and permanent agriculture, occupied by hilltribes as well as *Khon Muang*; and
- (3) a zone of high mountains with shifting cultivation by hilltribes.

These three zones indicate the influences of physical environments on human society as well as the adaptation of human settlement to the constraints of nature. The local communities selected for this study also reflect the three-zone characteristics but at a local scale. They are situated in the first zone with some agricultural activities in the second zone while their community watersheds occupy the third zone. The profile of the four selected communities will be discussed in the next section and more details in Chapter 6.

3.2 The Four Selected Communities

The selection of the communities was based on the theoretical framework elaborated in Chapter 2. Thus the target communities are ones that have managed watersheds as common property resources under the governance of local institutions.

The framework for case selection was formulated from baseline data available at the Social Research Institute (SRI), Chiang Mai University. Two major sources of data provided primary information about community-based watershed management in the Upper North:

- (1) *Inventory of Community Forests in the Upper North: A Case Study of Villages' Initiatives in Forest Conservation* (The Community Forestry Action Research Project, SRI, 1991).
- (2) *Baseline Data of Forest Resources in the Upper North: The Workshop Proceedings* (The Coordinating Committee of Non-Governmental Organizations of the Upper North and SRI, 1991).

Both documents provide essential information such as the name of each community, location, size of forest area, patterns of forest resource use, organizational arrangements, and initial conditions of its emergence. In addition to these sources, useful information was obtained from personal discussions with researchers and NGO workers involved in the Community Forestry Action Research Project, at the Social Research Institute.

From this information base, a list of all community forests was compiled, resulting in 146 communities all over the Upper North. However, not all of these community-based forest management initiatives have been formed solely for the purpose of watershed conservation. Some cases are sacred groves preserved for ritual or religious purposes. Many have been created simply for village woodlots. The initial rationale behind the emergence of such community-based forest management also

varies widely encompassing religion, awareness of drought, threat from invasion of outside users, anti-concession, to protest dam construction, and as an initiative of a non-governmental organization (NGO) project.

The organizational arrangements responsible for the management of community forests also vary from one community to another. At Tambon (sub-district) level, the responsibility may fall to the Tambon Council, at the village level, the Village Committee may take charge. However, there are also some communities where a special decision-making body is responsible, for example, senior citizens, monks, water user groups, or a conservation group under supervision of the NGOs. The size of watershed forests range from less than 100 rai (mostly the sacred groves and religious sanctuaries) to more than 10,000 rai (mainly the watershed forests).

At this point, it is necessary to elaborate on the criteria used for selection of the communities. These major criteria are:

- (1) size of the watershed forest;
- (2) number of resource users;
- (3) scarcity of watershed resources; and
- (4) the level of decision-making arrangement.

These criteria have proven relevant to the problems of CPR management as discussed earlier. Several empirical studies have indicated that small size, clearly-defined boundaries, a small number of resource users, moderate scarcity of the resources, and a village-level decision-making arrangement are likely to contribute to the viability of successful common property resource management (The U.S.

National Research Council, 1986; Wade, 1988; Ostrom, 1990).

From the initial list of 146 communities, first, the community forests which were not managed as watersheds were screened out. This step reduced the list to 60 communities, which were then considered on a case by case basis. In this process, any community which had either government agencies or non-government organizations operating the activities concerning the community forestry was removed from the list. Furthermore, the communities in which conflicts in resource management were known to be particularly severe were also eliminated. In such cases, it is difficult to gain trust and cooperation from the local people.

The above process left 12 communities from which to make the final decision. Final case selection was made taking logistical considerations into account, including time and budget constraints, with minimal compromise of expected quality of the case study design. Field trips to each of the 12 communities were arranged to assess the feasibility of working there. Finally, four communities were selected. Following is the setting of the communities.

Ban Luang

"Ban Luang" is literally the name of a group of four Tambon² (sub-districts) - namely Paa Kha Luang, Suad, Pi, and Fah - that will be aggregated to be a full-scale district (Amphoe) in the near future. At present, in the transition period, its status is called "Khing Amphoe" or branch district³. In most senses, it is actually a district.

Years ago, the present area of Ban Luang was a single Tambon called "Suad".

Ban Luang is located 45 kilometres to the west of the City of Nan (Figure 3.2). It has an area of 338.21 square kilometres or 211,380.25 rai (Ban Luang Branch District Office, 1991), 2.95 percent of the total area of Nan Province. The topography of Ban Luang is characterized by a small basins with undulating plain areas and gentle slopes (2-8 percent) surrounded by a range of mountains. Three fourths of its area is mountainous highland covered by forest. The elevation ranges from 300 to 1,200 metres above MSL.

In 1991, Ban Luang had a population of 11,459. Population growth rate is 1.05 percent a year. There are 2,755 households in 25 villages. All the population are Northern Thai or *Khon Muang*. Most of the villagers are peasants whose livelihoods are dependent on agriculture, mainly wet rice and rainfed cultivation. Livestock is a major source of supplementary income. The livelihood of the people is highly dependent upon the sustained yields of watershed resources.

The major source of water is from the monsoon rain which averages 1,174.40 millimetres per year (Ban Luang Branch District Office, 1991). Two main streams that feed Ban Luang basin are Nam Suad and Nam Pi (Figure 3.3). These streams join together before flowing to the Yom river - one of the four tributaries of the Chao Phraya river - in Chiang Muan district, Phayao province.

The lower valley is mainly used as paddy field. Some areas in the upland and highland zones are cleared for rainfed crop lands. The national reserve forests cover 75 percent of Ban Luang area.

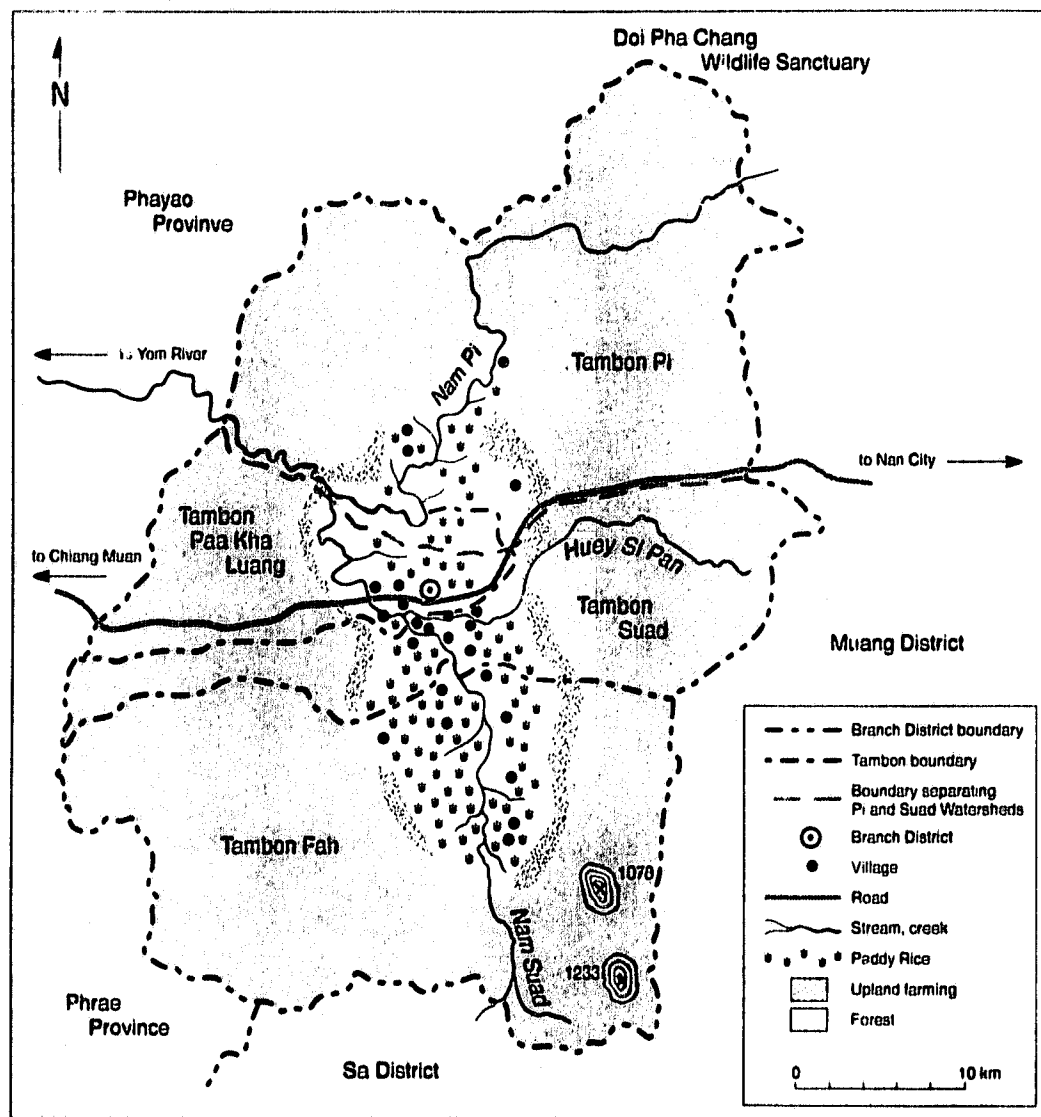


Figure 3.3 Map of Ban Luang

Almost a third of forested area has been encroached upon in the past decades. The patterns of land use in Ban Luang can be classified into: community settlement and public areas 21,138 rai; agricultural areas 31,706 rai (paddy field 7,216 rai, crop land 18,079 rai, and orchard 6,411 rai); and forest areas 158,536 rai (Ban Luang Branch District Office, 1991).

The boundaries of Ban Luang are coincidentally delineated by the watershed boundaries (Figure 3.3) The Ban Luang branch district administration has adopted a master plan for small watershed development to implement the integrated development of water, soil and other resources, and the environment. In so doing, Ban Luang basin has been divided into two micro-watersheds - Nam Suad and Nam Pi watersheds.

The Nam Suad watershed covers an area of 22 square kilometres consisting of Tambon Suad, Paa Kha Luang, and Fah. There are 21 villages with a combined total of 2,183 households. The Nam Pi watershed covers an area of 116 square kilometres which is the entire area of Tambon Pi with 572 households. These two watersheds are used as the planning units for other rural development projects in Ban Luang branch district.

Community-based watershed management (CBWM) in Ban Luang began in 1974 when a sawmill company from Nan City sent its loggers to cut the trees along the two sides of the Ban Luang-Nan road. Logging invaded into the headwater area - namely Huey Sipan - which Ban Luang peasants had preserved as a source of water for generations. The villagers informed the provincial administration about the

destruction of the watershed and requested that logging activities in the headwaters be stopped immediately. The saw mill company, however, insisted on logging, as it had been granted a concession from the government.

The situation became more intense and led to a confrontation between the peasants and loggers. On December 21, 1974, a group of 500 peasants led by the leaders of the *Muang Fai* groups, namely Mr. Pan Inlee, Mr. Kuan Ar-yuyun, Mr. Chee Khonsoong, and Mr. Kong Ar-yuyun, seized 5 trucks and 10 employees of the saw mill company and blocked the log-hauling road. The peasants demanded the complete withdrawal of logging activities from the headwater areas. The blockade lasted for 7 days until the saw mill company complied unconditionally with the peasant demands. The peasants then returned the trucks and equipment and released the employees. Some 3,600 logs have been left rotten in Huey Sipan ever since. No one is allowed to bring them out either for private use or public use. Nowadays, the peasants who were involved in the blockade still talk about their heroic victory with pride. This incident is similar to the peasant rebellion against the infringement of the collective control of rural resources by the capitalist and the state in James Scott's moral economy approach (Scott, 1976).

It is widely known that during the blockade the leaders of the peasants had sought advice and support from student leaders at Chiang Mai University. Meanwhile the provincial administration was reluctant to use armed force to end the confrontation because Ban Luang area at that time was sensitive to the influence of the Communist Party of Thailand (CPT). Were force to be used the peasants might

become hostile to the government and ally with the CPT. Two years later after the massacre at Thammasat University in Bangkok in October 6, 1976 and the subsequent military coup, the Ban Luang forest became a sanctuary for the dissident students who fled from the government suppression (Kong Ar-yuyun, 1992, personal communication).

Since these events Ban Luang headwater forests have been protected from cutting and clearing. The leaders of the *Muang Fai* groups in cooperation with the *Khamnan* (headman of Tambon) and *Phuyaiban* (village headman) reached this agreement unanimously and agreed to enforce and monitor their members as well as the fellow villagers.

It is amazing that there are no hilltribe villages in the forests of Ban Luang. Once, however, there were Hmong hilltribes clearing the forest to grow opium and practice shifting cultivation in the watershed area. When informed, the villagers, led by their headman, destroyed the opium and maize plantation and burnt down the hilltribe villages. Since then there have been no hilltribes around this forest area.

Silalaeng

Silalaeng is a Tambon in Pua district, Nan province. It is located to the north of the City of Nan, about 60 kilometres by highway from Nan (Figure 3.2). Tambon Silalaeng has an area of 98 square kilometres. The community settlements and agricultural areas of Silalaeng occupy the lowland area laying at the foot of the Doi

Phuka range. The settlement is concentrated in a cluster pattern on a relatively high, level, lowland area in order to leave the fertile, but limited, lowland for agricultural land uses. The elevations of the lowland area range from 200 to 500 metres above mean sea level.

Tambon Silalaeng is comprised of 10 villages. There are 1,231 households with a population of 6,291 (Table 3.7). Land use includes paddy field (2,982 rai), rainfed crop land (5,454 rai), and orchard (1,285 rai). Most wet rice fields are irrigated by the traditional irrigation system (*Muang Fai*). There are 7 weirs on three major streams, namely Nam Khun, Huey Harn, Huey Hin Lap (Figure 3.4). Nam Khun is the largest source of water for irrigation in Tambon Silalaeng. The headwaters of these streams are in the Doi Phuka mountain range, which rises to elevation of over 1,000 metres.

Most of the population in Silalaeng are Northern Thai or *Khon Muang* and Thai Lue, except those in three villages, Nam Peon, Huey Sanao, and Paa Klang, which are hilltribe communities relocated from the mountain areas during 1967-1970. They are Hmong and Yao evacuated from the areas of fighting between the government forces and the communist guerillas.

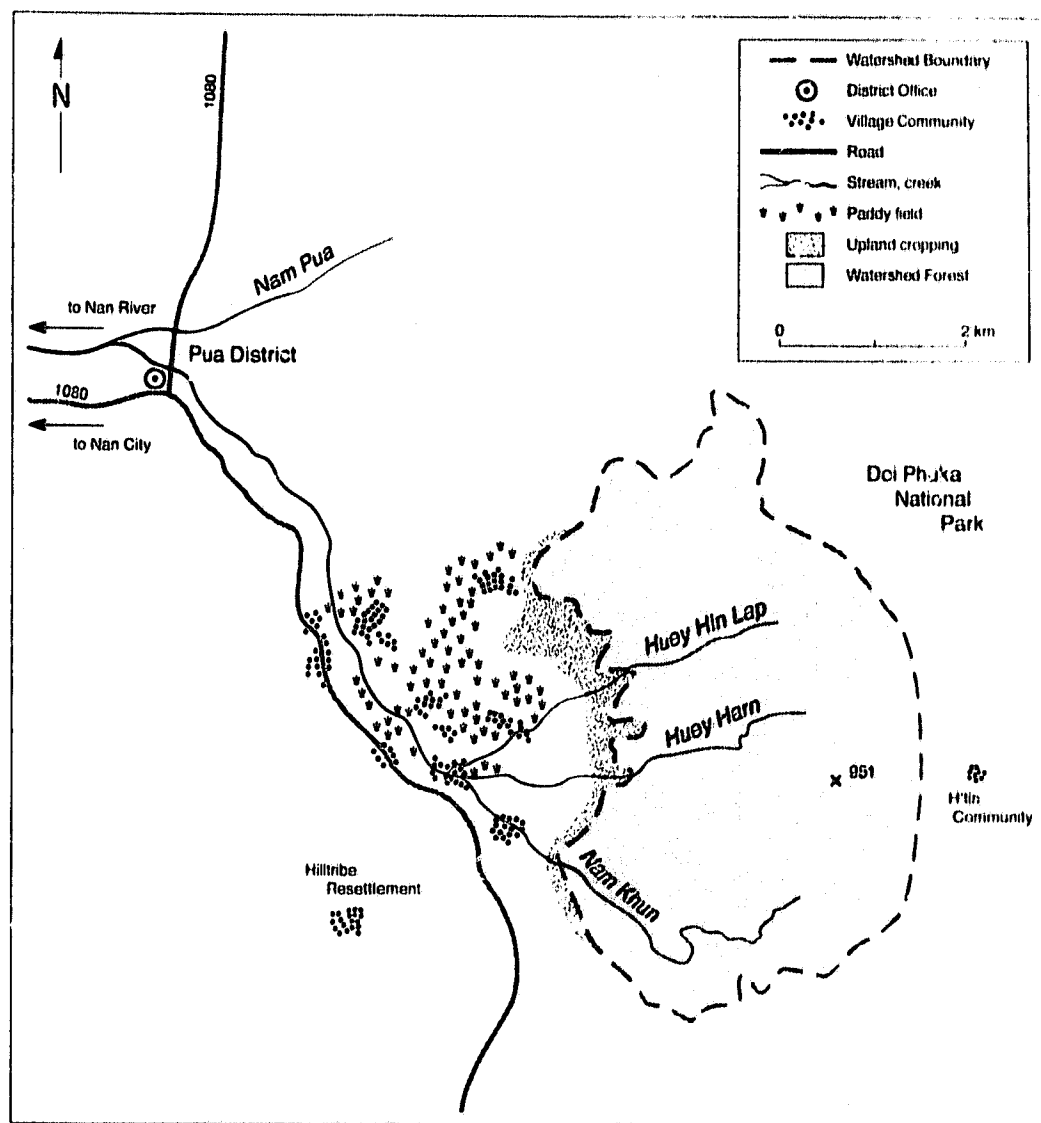


Figure 3.4 Map of Silalaeng

Table 3.7 The villages in Tambon Silalaeng

Villages	Household	Population	Paddy (rai)	Upland (rai)	Orchard (rai)
Ban Hia	127	614	365	67	71
Sala	150	700	475	1,000	150
Don Chai	125	523	485	681	36
Teen Tok	120	570	204	353	53
Hua Nam	110	485	204	315	84
Hua Doi	129	574	477	240	102
Ban Fai	58	325	465	599	-
Nam Poen	183	1,655	96	585	215
Huey Sanao	90	717	30	880	134
Paa Klang	139	1,212	182	734	440
Total	1,231	6,291	2,983	5,454	1,285

Source: Silalaeng Tambon Council, 1992

Before 1982, the area of Tambon Silalaeng included the upper part of the watershed (Figure 3.4) which is now an area of the adjoining Tambon Phuka. Ethnically, Tambon Phuka is a H'tin community, one of the hilltribe minorities in Northern Thailand. Tambon Phuka was officially established on June 1, 1982. The H'tin mostly practice an integral shifting cultivation system similar to that of Karen-Lua's established swidden system⁴ that causes concern among Silalaeng residents about the destruction of the headwaters they depend upon.

The relationship between the H'tin in the highlands and the *Khon Muang* in the lowland valley is sometimes one of conflict, and characterizes the basic problem

of watershed management which, if not handled properly, may hinder any effort to maintain the stability of resource use in the watershed. This situation, although at a small scale, exemplifies the current situation of the watershed problem in Northern Thailand and in many developing regions of the world.

The evolution of Silalaeng community-based watershed management (CBWM) began under the leadership of Khamnan Muangdee Preedawong during 1967-1977. At the beginning there were no clear guidelines nor rules imposed for watershed forest protection, but there were the common concerns over the diminishing forest and long periods of drought. These issues were first raised in meetings of the Tambon Council (*Sapha Tambon*) in 1976. However, not until 1979 under the leadership of Khamnan Thawaj Yangyun who continued the determination of his predecessor, was the regulation prohibiting shifting cultivation promulgated. The villagers had come to the conclusion that shifting cultivation was the major factor in watershed degradation. Rules and penalties in CBWM were strengthened during the period of Khamnan Thawaj Yangyun, 1977-1989.

The institutional arrangements for community watershed forest since then have evolved to keep up with changes in the community and outside influences. At present, they are entering the third period of development under the leadership of Khamnan Charoon Harnyuth.

Thung Khao Hang

Thung Khao Hang is a village of *Khon Muang* in Tambon Thakian Pom, Thung Hua Chang branch district, in the Province of Lamphun. It has 157 households with a population of 604. Most of the nearby villages are Karen communities who also make up the majority of the population in Thung Hua Chang branch district. Thung Khao Hang is located at the most southward extremity of the Province of Lamphun, about 110 kilometres by highway from the City of Lamphun (Figure 3.2), and about 15 kilometres from the Thung Hua Chang branch district office. A shorter access from Lamphun to the village is under construction starting from the paved highway in Amphoe Paa Zang, a distance of about 45 kilometres. This road, when finished, will shorten by almost half the present transportation route, and Thung Khao Hang will become the gateway of Thung Hua Chang (Figure 3.5).

Thung Khao Hang is probably one of the most remote areas of Lamphun province. It is characteristic of the poverty-stricken periphery of the prosperous core of the Chiang Mai-Lamphun basin. Thung Khao Hang, situated in a small valley (elevation of 658 metres) surrounded by high mountains (elevation over 800 metres above mean sea level), is a small community in the forest. The forest is only a few minutes walk from the outskirts of the village. The villagers utilize the narrow valley for their paddy field in the rainy season. The livelihood of the villagers is highly dependent on the forest. It is estimated from the household survey data that there are about 450 rai of paddy fields, 200 rai of uplands, and less than 100 rai of

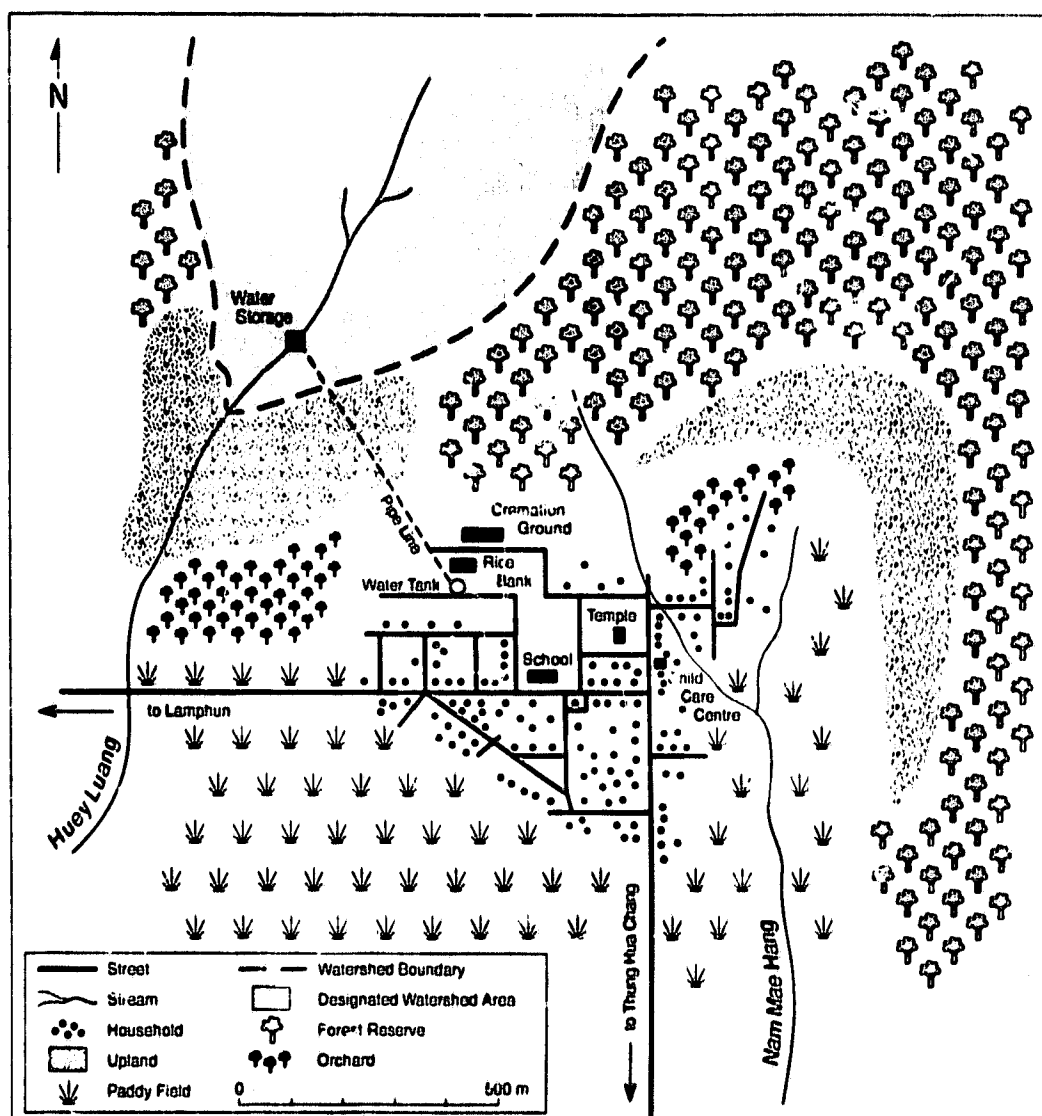


Figure 3.5 Map of Thung Khao Hang

orchards.

In watershed terms, Thung Khao Hang is in the upper part of the watershed. The forests are the headwaters for the Nam Li river that feeds the fertile downstream areas in Amphoe Li, Amphoe Ban Hong, and Amphoe Paa Zang where the Nam Li joins the Ping river. Thung Khao Hang is, unfortunately, situated on a site too high to make use of the Nam Li. The stream on which it depends is only a small tributary of the Nam Li.

This part of the Province of Lamphun is comparatively dry especially in summer. In fact, Lamphun held the second least rainfall record (1,024 mm.) in the Upper North after Phayao (956 mm.) during 1951-1985 (NESDB, 1992). Although statistics of rainfall are not available for such a small area, stories of long periods of drought told by the senior villagers are convincing. Moreover, the scene of cows starving to death because of the water shortage was witnessed during field work. The villagers reported in mid May that there had been no rain since February.

The forest in this area used to be rich in teak and other valuable timbers. In the past decades, the forests have been cut down by loggers and villagers as well as by shifting cultivators. The villagers of Thung Khao Hang have experienced acute water shortages, as mentioned above, and they perceive that this has resulted from the destruction of watershed forests. Thus the village committee, led by the village headman, created rules for the watershed forest with the unanimous consent of the villagers. These rules prohibit tree cutting in the designated forest area preserved for the headwaters. The rules are created as part of the general regulation of the village,

known as *Khodmai Muban* (law of the village). The village committee enforces these rules.

Ban Pae

Ban Pae is a small village of Tambon On Tai on the outskirts of the fast growing district of San Khampaeng, Chiang Mai province. It is located about 25 kilometres from downtown Chiang Mai, and about 15 kilometres from Boh Sarng - a manufacturing area and tourist attraction - where the villagers of Ban Pae commute to work daily (Figure 3.6). By and large, Ban Pae appears to be on the fringe of urban sprawl.

Ban Pae is situated on a gentle slope at the foot of the hill adjacent to the Mae On national reserve forest. The elevation is about 300 metres above mean sea level. The name "Ban Pae" comes from the type of native forest, that is, a dry dipterocarp forest which the local villagers call "Pae." The settlement of Ban Pae began in 1933 when three households from the nearby village, Ban Wang Tharn, moved to settle in the "Pae" forest. In 1943 there were 7 households. By 1965 the village had 47 households, most of them came from Ban Wang Tharn. Ban Pae officially became a village in 1970.

At present, Ban Pae has 84 households with a population of 264 people. Patterns of land use in Ban Pae include: paddy field (253 rai); crop land for tobacco (93 rai) and sugar cane (48 rai); orchard (35 rai); and residential area (65 rai).

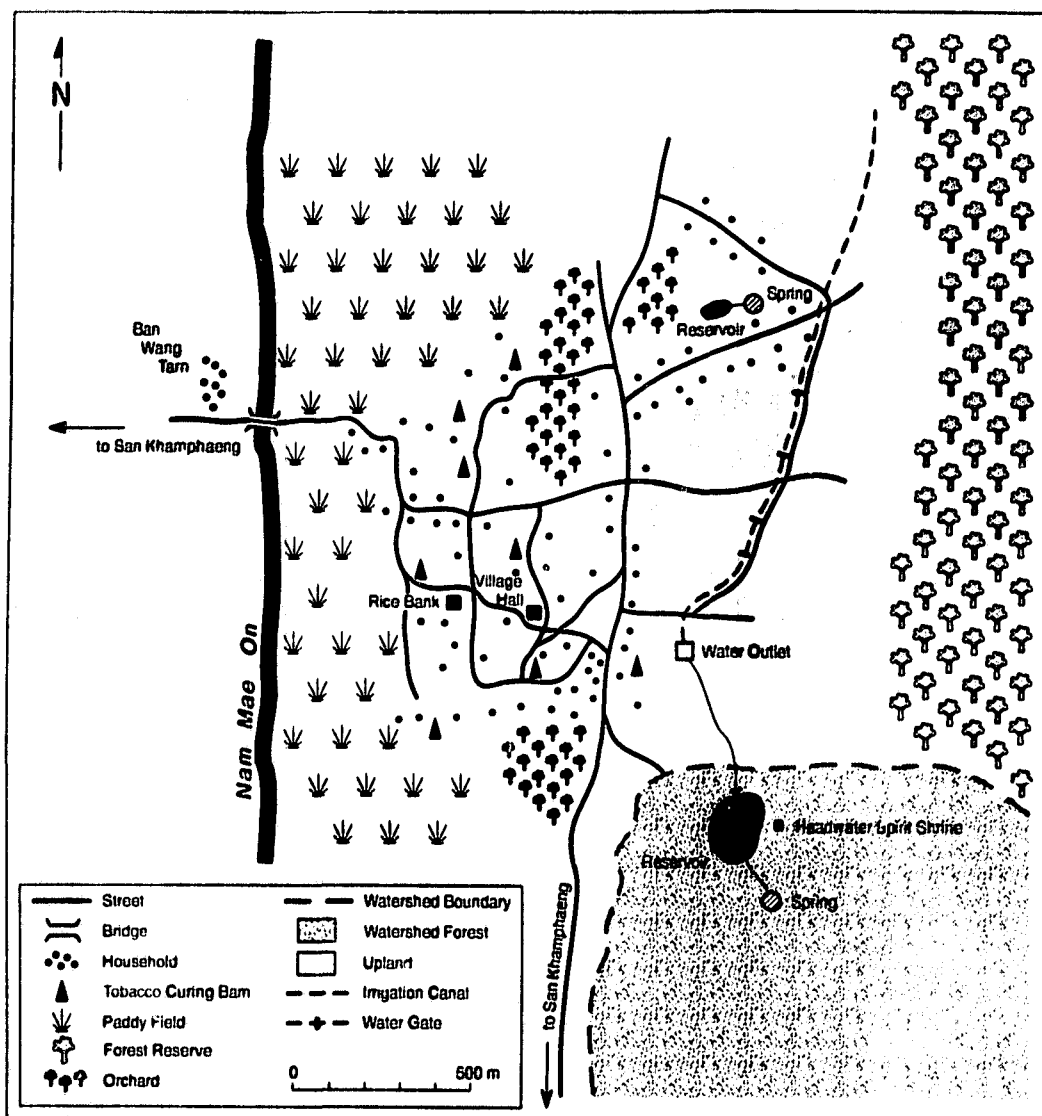


Figure 3.6 Map of Ban Pae

Landless farmers account for 16 percent of the total population. It has 65.3 percent of the households with agricultural land holding less than 10 rai; 14.7 percent with 10-20 rai, and 4 percent with more than 20 rai (Charoenraksa, 1990).

The history of the Ban Pae community watershed forest probably began at the same time as its settlement. At first the conservation of the watershed forest was based on the myth and belief of the villagers since there is a spring water emerging from the ground. The villagers believe that a spirit lives in, and guards, the forest surrounding the spring, which they call Huey Ban Yoop. Therefore every year in August, the villagers hold a ceremony to pay respect to the spirit of the headwaters. In the early period, there were 3 springs but 2 of them have since dried out which the villagers believe is caused by nearby forest clearance.

The forest area, located to the east of the village, has an elevation of 400-600 metres MSL. There are two types of forest. First, on the top of the hill at the elevation of 600 metres with a rocky and lateritic soil, the type of forest is a dry deciduous dipterocarp forest. The trees have diameters ranging from 0.50 to 1.58 metres with the average height of 15-20 metres. Second, on the lower hill at the elevation of 500 metres with a loamy soil, the type of forest is a moist mixed deciduous forest, mainly teak (*Tectona grandis*). Teak in this forest has diameters ranging from 0.77 to 3.20 metres with average height of 20-25 metres (Charoenraksa, 1990).

The villagers have built a canal from the spring and diverted the water to irrigate paddy fields, and for the domestic use of the residents. Nowadays the water

from the spring is stored in a reservoir with a capacity of 10,930 cubic metres. The water is distributed to the cultivated lands and the residences by a concrete-structured water gate.

The long and successful history of the Ban Pae watershed forest has turned Ban Pae into a regular port of call for many study tours from the training programs and workshops on community forestry, especially ones sponsored by the RFD. The senior villagers are amazed by the high publicity of what they have done just simply to preserve the headwaters that their livelihood depended upon.

In summary, the four communities selected represent four different types of communities following the criteria set forth earlier. Ban Luang is a community with a large watershed area, a large number of resource users, a relative richness of watershed forest, a distant proximity between watershed forest and community center, a locality level of decision-making arrangements, and in the a middle period of institutional evolution. Silalaeng is a community characterized by a medium-size watershed area, an intermediate-size group of resource users, a middle-range proximity between the watershed forest and the community, a moderate scarcity of watershed resources, a Tambon level of decision-making arrangements, and an upper middle period of institutional evolution. Thung Khao Hang is a community with a small watershed area, a small number of resource users, a middle-range proximity between the watershed forest and the village, a high scarcity of watershed resources, a village level of decision-making arrangements, and an infant period of institutional evolution. Ban Pae is a community with a very small size of watershed area, a small

number of resource users, close proximity of the watershed forest, an extreme scarcity of watershed resources, a village level of decision-making arrangements, and a long period of institutional evolution. The prominent characteristics of the four selected communities are summarized in Table 3.8.

Table 3.8 Summary of prominent characteristics of the four selected communities

Characteristics	Ban Luang	Sila- laeng	Thung Khao Hang	Ban Pae
1.watershed forest (rai)	158,536	60,625	2,000	446
2.number of users (hh.)	2,755	1,231	157	86
3.proximity (km.)	5-6	1-2	3	0.5
4.resource scarcity	mild	moderate	high	very high
5.level of decision- making arrangements	locality	Tambon	village	village
6.historical development	middle	middle	short	long

Notes

1. This dialect is also spoken by the people in some area of Tak province and in Lab Lae district, Uttaradit province in the Lower North.

2. The Thai administrative system categorizes the administrative unit in hierarchical form from the smallest unit to the kingdom, that is, *Muban* or *Ban* (village), *Tambon* (commune), *Amphoe* (district), *Changwat* (province), and Kingdom of Thailand.

3. Expansion of the *Khing Amphoe* (branch district), according to the government rationale, is a usual process to provide government services and facilities for people in a remote area, and to open up a new market center. Some scholars, however, consider this process as expansion of the state authority to gain control over the local community (Hirsch, 1990b).

4. See more details in Van Der Meer (1981) about Conklin's (1957) classification of swidden systems which are divided into two major systems: (1) The partial systems with two subtypes - the supplementary swidden and incipient swidden farming; and (2) The integral systems with two subtypes - the pioneer swidden and established swidden farming. Meanwhile Kunstadter and Chapman (1978) classify upland cultivation into three types of swidden cultivation land use and one type of permanent upland cultivation: (1) short cultivation-short fallow (often used by Northern Thai); (2) short cultivation-long fallow, or "forest fallow" (often used by upland Karen and Lua); (3) long cultivation-very long fallow or abandonment (often used by Hmong and other opium growing hilltribes); and (4) permanent field tree crops, associated with use of forest for swidden rice and fuelwood.

Chapter 4

Conceptual Framework and Research Methods

This chapter links the research questions and theoretical background discussed earlier to the specific research approach used in the study. Two major tasks will be undertaken. First, relevant theories and concepts are reconceptualized into an analytical framework for empirical research. Second, the research method and procedures employed in this study will be described sequentially including research design, variable identification, development of questionnaire and observational guidelines, field survey and observation, data processing, and data analysis.

4.1 Reconceptualizing a Framework for the Study

The conceptual framework used in this study has been reconceptualized from the original work of Ronald J. Oakerson (1986) - *Model for the Analysis of Common Property Problems*¹ - which has recently been revised as a framework for analyzing the commons (Oakerson, 1992). Oakerson's framework is a general conceptual framework that can be used in analysis of the commons across a variety of resources rather than specific to certain resources and settings.

Oakerson's concept of the commons, based on the different attributes between public and private goods, is defined as an economic resource subject to individual use

but not to individual ownership (Oakerson, 1986). The key problem of the commons is how to coordinate joint use by a community of users in order to obtain an optimal rate of use (and flow) overall. (Oakerson, 1992).

In this section, based on Oakerson's Framework, each component or set of variables will be briefly discussed first, then the relationships among them will be examined. Finally, the application of the framework for both diagnostic and prescriptive purpose will be presented.

4.1.1 Components of the Conceptual Framework

For the study of community-based watershed management (CBWM) in Northern Thailand specifically in the context of local institutions, the Oakerson model (1986) can be further developed as an analytical framework by incorporating Ostrom's (1990) *Framework for Analyzing Institutional Choice* into the model (or framework in Oakerson, 1992). Thus, the conceptual framework for this study is made up of five major components as shown in Figure 4.1.

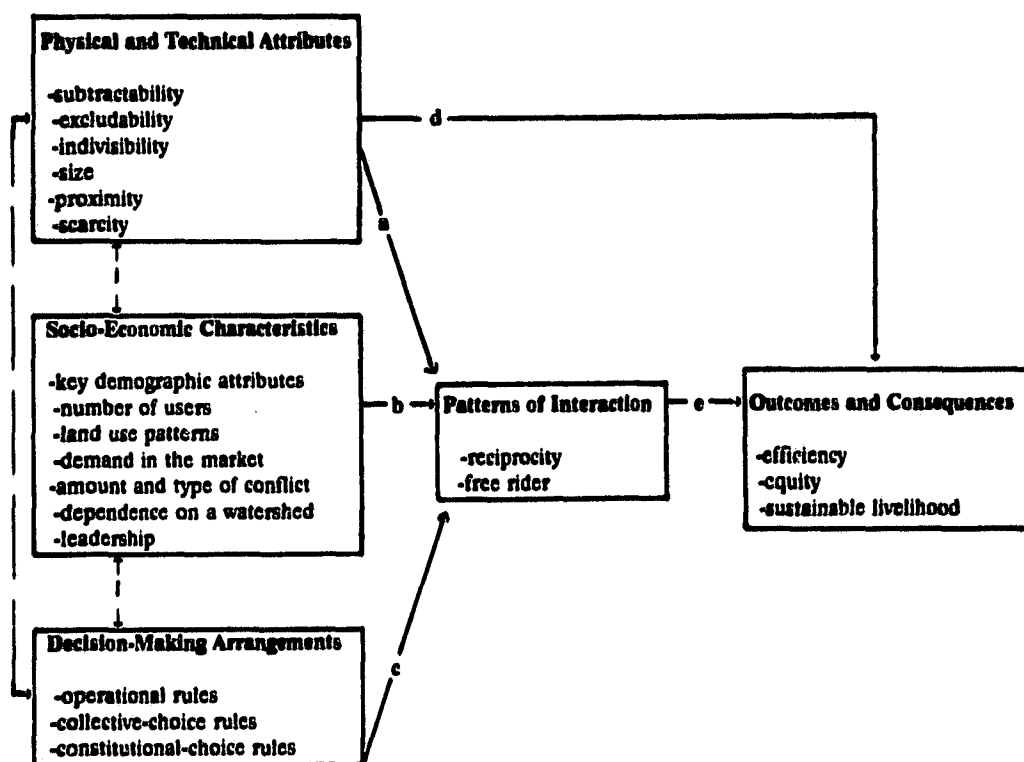


Figure 4.1 Conceptual Framework for Analyzing the Commons
(After Oakerson, 1986; 1992 and Ostrom, 1990)

Oakerson cautions about using his framework that it should not be rendered as a completely specified causal model that contains all relevant variables and relationships in every commons situation. He states that it is not a model to feed data into and produce predictions from, the framework should rather function as heuristic terms of reference for analyzing the logic of the relationships and reflecting a range of alternatives (Oakerson, 1992).

(1) Physical and Technical Attributes

One set of problems of common property resources originate from the constraints either ascribed by nature or limited by state-of-the-art technology. Three important physical and technical attributes are:

Jointness. For pure public goods, jointness means that the use of the resource by an individual user does not make the resource unavailable to the others. For a common property resource (impure public goods), jointness is not unlimited but determined by a threshold. At some point, the commons will be subtracted by the use of individual users. As a variable, jointness in the commons refers to the degree of subtractability, which varies from one situation to another. Jointness ordinarily refers to simultaneous use, but can also be applied with serial use (Oakerson, 1992).

Subtractability in a CPR can occur in two steps. First, any use of the commons by individual users is subtracted from a flow of resource units - whether it is a cubic metre of water, fodder, firewood, or timber - is unavailable to others. Second, a cumulative use by several users will eventually extract from the total yield of the commons (the resource system) over time. It is the second type of subtractability that makes the problem of the commons distinctive from that of pure public goods and private goods. In short, "each individual user is potentially capable of subtracting from the welfare of other users; but, within limits, all users can derive benefits jointly" (Oakerson, 1992: p.44).

Application of the subtractability concept in the analysis of watershed

resources is necessary to specify as precisely as possible the "limiting conditions" concerning natural replenishment or otherwise determining the threshold at which the watershed system deteriorates. The physical conditions of the watershed given by nature or technological feasibility provide important information for making rules to maintain joint use in the specific watershed. Thus, resource use can be efficient if it is regulated by rules based on limiting conditions of the physical and technical attributes of the watershed.

Exclusion. The commons is often mistaken as a resource with unlimited access. The commons is not an open access, but sometimes has an access-control problem. As a physical and technical variable, in comparison with complete exclusion in private property and nonexclusion in an open access, the degree of excludability in the commons originates from the limiting conditions of exclusion ascribed by nature or technology, not from rules. Two types of exclusion can be observed in the use of watershed resources. First, exclusion that is applied on an individual basis. Second, exclusion that is applied to a group, or to those outside the given community. The degree of excludability in both types varies from one specific watershed to another.

Indivisibility. Indivisibility is dependent upon a scale determined by the physical boundaries. By nature, a CPR cannot be divided without significantly impairing its management potential or productive value (Oakerson, 1992). Because of physical attributes and/or technological feasibility, it is impossible to divide the common property resource among individual users. However, at some scale, a certain type of commons may be divisible by natural boundaries, for example watershed

boundaries. In most cases, the divisibility of the commons relies mainly on human design rules. In the case of watersheds, divisibility may depend on a combination of the physical boundaries and the rules which vary from one watershed and community to another.

Other physical attributes. Related physical factors that might cause management problems of the commons, particularly watershed resources, include size, proximity, and scarcity of resources (The U.S. National Research Council, 1986; Wade, 1988). These physical factors when combined with the three physical attributes mentioned above may have significant effects on commons' situations.

In summary, common property resources are generally characterized by partial jointness, or in other words, partial subtractability, with the probability of some difficulty in exclusion (partial excludability), and within a limited set of physical boundaries (Oakerson, 1986). These characteristics vary among the different common property resources. For analysis of the watershed, these characteristics vary from one site to another depending on other combined physical and technical attributes of the given watersheds.

(2) Socio-Economic Characteristics

This component has been added to the original framework of Oakerson (1986; 1992), and is adapted from *A Framework for Analyzing Institutional Choice* formulated by Elinor Ostrom (1990). She argues that the conventional models (discussed in

Chapter 2) ignore the capability of individuals to devise and develop their own institutions where everybody can benefit jointly.

Ostrom (1990) criticizes the conventional theories of collective action for lack of key variables needed to explain self-organized processes. She, like Oakerson, disagrees with the specified causal model because, to get specific results from a model, some variables may be omitted or intentionally held constant. Such models tend to produce likely behavior and outcomes in a situation with a particular structure² (Ostrom, 1990, emphasis in original). They may not be applicable on a wider basis.

Instead of building a specific model, Ostrom develops a framework³ to identify sets of variables that are most likely to affect decision making of the individuals in resource use. The framework can be used to organize empirical research to generate findings about the importance of particular variables in the context of other configurations of variables. Thus, a theoretical development can derive from the empirical studies that help identify variables essential to explain and predict the success or failure of the management of the commons. Such theoretical development in turn helps identify the important variables to be taken into account in further empirical and theoretical work (Ostrom, 1990).

The "situational variables" in Ostrom's *Framework for Analyzing Institutional Choice* are mostly identical with those components in the Oakerson framework. The additional variables are grouped into this component - the socio-economic characteristics of the user community (Figure 4.1).

(3) Decision-Making Arrangements

This component is broadly defined as both the institutional and organizational arrangements as discussed in Chapter two. It consists of rules that govern individual and collective behavior in the use of ~~the~~ particular resource characterized by the first component, in response to the specific conditions occurring in the second component.

In one way or another, "decision-making arrangements are defined by authority relationships that specify *who* decides *what* in relation to *whom*" (Oakerson, 1992: p.46). From a policy perspective, institutional arrangements are the most important component in common-property resource management (Shui Yan Tang, 1991). In a rule-structured situation, individuals choose specific actions from a set of allowable actions in light of existing incentives. However, rules, as social artifacts, are subject to human intervention. By changing the rules, it is possible to alter the structure of the situation and incentives facing individuals, and the way they relate to one another in making decisions regarding the use of resources.

Decision-making arrangements are categorized into three subsets or levels of rules: operational rules, collective-choice rules, and constitutional-choice rules. Some discussion on these topics has already taken place in Chapter 2 regarding the multiple levels of the analytical framework proposed by Ostrom (1990). Following are the operational definitions used in this study.

Operational rules. These rules are usually created by a group of users or a local community to govern the behavior of its members in appropriation and

provision of the communal resources. Any kind of use that is harmful to the sustained yield of the resource is prohibited such as commercialization of the forest products. When the multiple uses of resources are in conflict, operational rules are needed to set the priority of resource use. In some cases, the operational rules involve partitioning of the commons by the types of use, duration, or amount of resource units. In general, operational rules differ from one community to another depending on the physical and technical attributes of the resources in the first component, and the socio-economic characteristics of the user community in the second component.

Collective-choice rules. These rules, according to Oakerson (1992: p.47), "establish conditions of collective choice to allow a group of appropriators to manage their commons", and is simply understood as a "common-property" arrangement. Under the conditions of collective choice, individuals act collectively in making use of the commons. However, individuals still maintain their rights of entry and exit, or the opportunity to say no in any process of collective decision making (Oakerson, 1986).

In this study, the collective-choice rules, after Ostrom (1990), are concerned with government policies toward, and the official recognitions of, the rights of local communities in managing their own watersheds.

Constitutional-choice rules. This level of decision-making arrangements is usually external to the local community. Constitutional-choice rules may create the opportunity for the local community to engage in collective choice (Oakerson, 1992).

These institutional arrangements are the last resorts for resolving conflicts between resource users. External arrangements may include courts of law, a bureaucratic hearing committee, and third-party negotiators. In this study, the constitutional-choice rules include all kinds of legislation and government regulations that govern or authorize the jurisdiction in management of the watersheds.

(4) Patterns of Interaction

The presence of rules may not absolutely guarantee to produce an intended pattern of behavior. The final decision depends on the unobserved mental calculations of individuals who make choices (Oakerson, 1992), or the internal world of individual choice, according to Ostrom (1990). Given the circumstances of physical and technical constraints of the commons, the socio-economic characteristics in a user community, and the decision-making arrangements available to govern the use of the commons, individuals make choices of action which give rise to some patterns of interaction.

Conceptually, individuals calculate their choices by comparing the costs and benefits of alternative actions. In the particular circumstances faced by individuals, a "cost" is any perceived obstacle in choosing some alternative. In contrast, a "benefit" is any perceived inducement to choose one alternative over another (Oakerson, 1992 emphasis in original). Individual choices are therefore conditioned by a perception of obstacles and inducements in a particular environment.

In the commons, it is important that individual actions are interdependent; in the sense that how individuals are expected to behave creates the obstacles or inducements for others. An individual will continue a cooperative strategy as long as others also do the same. The mutual cooperations lead to a general pattern of reciprocity (Oakerson, 1992).

Reciprocity is more or less similar to exchange. But reciprocity is somewhat different from exchange in its lack of discreteness (Oakerson, 1988). Unlike a series of discrete exchanges, reciprocity is more like a single on-going "exchange" over time, a continuing interaction between persons or among a group of people based on mutual expectations of behavior. In reciprocal relationships, each individual contributes to the benefit of others with an expectation that others will do likewise, but without a fully contingent quid pro quo as in an exchange relationship (Oakerson, 1986). For this reason, reciprocity is susceptible to such patterns of behavior as free riding, opportunism, or shirking - a form of "easy riding" where one contributes less, or takes more, than expected in a reciprocal relationship (Oakerson, 1988). The establishment and maintenance of reciprocity relies heavily upon trust, fairness, and mutual respect along with social norms.

On the use of the commons, Oakerson (1992: pp.49-50) explains how reciprocity works:

An individual must practice restraint when the beneficiaries of his or her restraint consist mainly of others. At the same time, each individual draws the larger benefit, not from his or her own act of restraint, but from the restraint practised by others. Individuals can agree to a pattern of mutual restraint, and mutually enforce such a pattern, but they cannot trade one act of restraint for another the way

that individuals exchange commodities in the market. The *quid pro quo* that regulates an exchange relationship is unavailable to regulate reciprocity. Yet only through a pattern of reciprocity can individuals realize the joint benefit of mutual restraint. Instead of a *quid pro quo*, reciprocity depends on mutual expectations of future positive performance.

Reciprocity is also different from exchange in the conditions of action. Reciprocity relies on *ex poste* conditions while exchange is assured by *ex ante* conditions. Reciprocity can be gradually eroded when one individual starts free riding with the expectation that others continue to cooperate. But, an even more imminent obstacle to cooperation is a lack of assurance that others will cooperate, and the most imminent obstacle is the speculation that others will also choose free-rider strategies (Runge, 1986; 1992).

The challenging task in managing the commons is how to maintain reciprocal relationships among the resource users. Decision-making arrangements are therefore collectively invented by a user community to change the structure of obstacles and inducements that individuals otherwise would face (Oakerson, 1992). In addition to the presence of the institutional arrangements, successful collective action may rely on the degree of willingness and ability of resource users in monitoring one another's behavior in order to hold each other accountable to shared norms.

If reciprocal behavior discontinues, and is finally abandoned, a common property resource will become open access. Everyone will compete to exploit the resource without regard to the sustained yields. In this situation, the possible strategies of resource use may include concealment, deceit, cheating, intimidation,

threats, and violence (Oakerson, 1992). The consequence is the "tragedy of the commons" as described by Hardin (1968).

(5) Outcomes and Consequences

Patterns of behavior in the use of the resource directly produce physical outcomes reflecting in a resource system. The outcomes and consequences involve human use values, and are thus subject to human evaluation (Oakerson, 1992). In this study, the concepts of efficiency, equity, and sustainable livelihood security are used as the criteria to assess the outcomes and consequences of resource use. However, these concepts need to be translated into operational parameters. Given the research method of this study, participant observation and field survey, the outcomes and consequences of watershed resource use are measured from the satisfaction of the members of the community regarding these respective criteria. This inevitably involves value judgements.

Efficiency. Evaluation of efficiency in the use of a common property resource is concerned with the overall rate of use. In a particular watershed, physical and technical attributes indicate an optimal rate. Cumulative overuse, such as cutting too many trees from a watershed forest or harvesting too much water from a stream, diminishes the total yields of a watershed system, reducing the shares of the resources for each user, and can finally deplete the watershed resources to none. The uses of watershed resources can also be inefficient if underutilized.

In theory, the principle of Pareto optimality⁴ can be applied to identify whether the current use of the commons is efficient. However, given the limitation of the method of this study, it is almost impossible to conduct the technical and economic calculations needed to determine whether the current rate of use of the watershed resources is optimal. Therefore, the users' satisfaction with the current rate of use is used to measure the efficiency of resource use.

Equity. The problems of inequity in the use of the commons are closely associated with inefficiency (Oakerson, 1992). The basic question of equity is about distribution - are individuals receiving a reasonable and fair share from the use of the resources regarding their contribution to collective actions? Other factors contributing to inequities include arbitrary exclusion from the commons, irregular enforcement of rules, corruption, and abuse of power. The presence of inequities can promptly trigger the erosion of reciprocity which results in less efficient use of the resources. Inequities may escalate severe conflicts leading to mutual destruction of the resources and the communities. This study, in the same manner as measuring efficiency, measures equity from individuals' satisfaction regarding the fairness of sharing in appropriation and provision of the watershed resources.

Sustainable livelihood security. Overall evaluation of the consequences of the use of watersheds at the local level can be considered in terms of the sustainable livelihood of the user community that depends on the vital resources. The concept of sustainable livelihood security employed in this study is adopted from Robert Chambers (1988). This integrating concept includes these meanings:

Livelihood is defined as an adequate stock and flow of food and cash to meet basic needs. Security refers to secure ownership of, and access to, resources and income-earning activities, including reserves and assets to offset risk, ease shocks, and meet contingencies. Sustainable refers to the maintenance or enhancement of resource productivity on a long term basis (Chambers, 1988: pp.9-10).

Sustainable livelihood of the user community, in this study, is assessed from the satisfaction of individuals toward the prospective livelihood security under the present resource regime of community-based watershed management.

4.1.2 Relationships in the Framework

An analysis of relationships among those five sets of variables prescribed above is the principal purpose of using this framework, in order to understand the whole situation of the commons. Physical and technical attributes of the watersheds, socio-economic characteristics of the user community, and the decision-making arrangements all together affect patterns of interaction (lines *a*, *b* and *c* in Figure 4.1). The patterns of behavior in using the resources directly produce outcomes in the resource system and consequences in the welfare of the user community (line *e* in Figure 4.1). The physical and technical attributes also affect the outcomes and consequences directly (line *d* in Figure 4.1). Lines *a*, *b*, and *c* represent weak causal relationships; weak in the sense that user behavior is constrained, but not decided upon, by the physical environments, or by socio-economic settings, or by rules (Oakerson, 1992). Lines *d* and *e* manifest direct causal relationships because in an actual situation human discretion is not involved as a dependent (or intervening)

variable.

4.1.3 Application of the Framework as an Analytical Tool:

Specific Research Questions

The framework can be used to diagnose the problems of the commons by tracing backward through the lines of the relationship. In so doing, in this study, a series of questions will be asked:

(1) Questions about the outcomes and consequences of resource use include:

(a) What is happening to the yields of the watershed resources and to the well-being of the community?

(b) Are the resource users satisfied with the current rate of uses, the distribution of rights and duties, and the sustainable livelihood security?

(2) Questions seeking to understand the above answers include: Are there such patterns of behavior as reciprocity, free riding, opportunism, and shirking, in the use of the watershed resources?

(3) Questions about the variables conditioning such patterns of behavior include:

(a) What constraints and advantages are prescribed by the nature of the watershed resources and inherent in the technology available to make use of them?

- (b) What kind of actions are the operational rules designed to regulate?**
- (c) What are the incentives (inducements and obstacles) of users to follow, and of decision makers to enforce, operational rules?**
- (d) Are collective-choice rules open for considering alternative operational rules?**
- (e) Do external arrangements allow for the modification of collective-choice rules?**

There are also noncausal relationships among the first three sets of variables shown as the dashed line in Figure 4.1. A lack of congruence among these three components can create potential obstacles and inducements leading resource users to patterns of behavior that produce inefficiency and inequity, and destabilize sustainable livelihood security. Incongruence may occur in the form of mismatching between operational rules and the constraints that bear on the physical and technical attributes of the watersheds. Important points include: appropriation rules should be designed to minimize subtractiveness to maintain the yield of the watersheds; membership rules must be related to degree of excludability; boundary rules should match watershed boundaries. Furthermore, the rules in use have to correspond to the socio-economic attributes of the user community.

After the problems are diagnosed and identified the next question is how to recondition the patterns of interaction by modifying the rules and their mechanisms to match better the nature of the particular watersheds and community settings. This

is about institutional design and change which, in turn, can be initiated by working forward through the lines of relationship in the framework. It is the effort to adjust the causes and conditions (decision-making arrangements) to direct the effects (patterns of interaction) to obtain the desirable outcomes and consequences. In some cases, the socio-economic conditions of the community may evolve or adjust to the limiting conditions of the watersheds.

4.1.4 Application of the Framework in a Dynamic Situation

The use of the framework as a diagnostic tool in 4.1.3 is undertaken as a short-run analysis or cross-sectional study. In so doing, both the physical and technical attributes of the specific watershed and decision-making arrangements are assumed to be static, as are the socio-economic characteristics of the user community, to a lesser extent.

However, in a long-run analysis or longitudinal study, those sets of attributes are presumed to change over time. Institutional change can be analyzed retrospectively through the feedback along the lines of relationships in the framework. That is, undesirable outcomes can affect patterns of interaction through a process of learning from experience, causing resource users to realize and change their behavior. To change the patterns of interaction the resource users need to change the current decision-making arrangements to create new structures of inducements and obstacles. The physical nature of the watershed may change over

time through a natural process. Technical constraints of the watersheds may also be modified by technological innovations. At the same time, socio-economic conditions in the community may change as a result of external influence.

The study of institutional change needs long-term analysis which requires time-series data and historical records⁵. This is beyond the scope of this study. However, the issue will be brought to attention where it is relevant, and the data are available.

In summary, this modified conceptual framework is designed to serve at least four objectives. First, the five sets of attributes are used as the framework for data collection. Second, the relationships among the sets of variables are used as the guidelines in data analysis. Third, the framework is used as an analytical tool to diagnose and identify the problems of watershed management at the local community level. Fourth, the framework is applied to demonstrate how institutional changes can be accommodated to produce desirable outcomes.

4.2 Research Methods

4.2.1 Research Design

This research is a case study of community-based watershed management (CBWM) in Northern Thailand with an emphasis on institutional arrangements in managing the commons. In terms of the representativeness of this case study, the four

selected communities represent the concepts and phenomena rather than the entire region and population (Strauss and Corbin, 1990). This issue is related to scientific generalization where case studies, like experiments, are generalizable only to theoretical propositions and not to populations (Yin, 1989). In this sense, the four selected communities are not the same as the samples in statistical terms regarding the way in which they are selected (described in Section 3.2).

According to the basic typology of designs for a case study (Yin, 1989: p.46), this study is a "single-case and embedded" design. The single-case design here means that the study is treated as a holistic case study. An embedded (multiple units of analysis) design suggests that more than one community is selected for the case study. In addition to analysis of institutions at the community level, this study also recognizes relevant variables at the individual household level. It is designed to examine socio-economic characteristics, patterns of interaction, and satisfaction on the outcomes of resource uses of the individual users in CPR situations. Therefore it has to include an analysis at the "individual" level as well. In fact, both the individual and community units of analysis are related to one another to the extent that the aggregation of individual attributes results in the community level. Therefore this case study contains two levels of unit of analysis:

- (1) the community level which means that one community is one unit of analysis; and
- (2) the individual level which means that one individual household is one unit of analysis.

The differentiation of these two units of analysis dictates the sets of variables, methods of data collection, techniques of data analysis, and generalization.

4.2.2 Variables

The variables were generated mainly from the five sets of attributes of the conceptual framework discussed in 4.1. It is essential to separate the variables in this research into two levels corresponding to the two units of analysis and methods of data collection.

A. Community level. Information was collected on the following variables:

(1) Physical and technical attributes of watershed resources in a given community including:

- degree of subtractability of watershed resources,
- degree of excludability of watershed,
- degree of divisibility of watershed resources,
- size of a given watershed area,
- distance of a watershed from the community,
- degree of scarcity of watershed resources.

(2) Socio-economic characteristics of the community setting including:

- number of eligible users,
- patterns of land use,
- demands of watershed resources in the market,
- types and amount of conflict in resource uses,
- leadership in the community.

(3) Decision-making arrangements or institutions governing the management of watershed resources, i.e.:

- operational rules in day-to-day management,
- collective-choice rules such as administrative regulations and guidelines, official recognition, presence of officials,
- constitutional-choice rules, i.e., legal status of watershed forest.

(4) Pattern of interactions of the resource users which could be in the forms of reciprocity, free riding, shirking or opportunism.

(5) Outcomes and consequences of resource uses resulting directly from pattern of interactions in (4) and physical and technical attributes in (1) which can be observed by using the following variables:

- efficiency in the uses of watershed resources evaluated from users' satisfaction,
- equity in the distribution of returns or equal access to the watershed, and fair contribution evaluated from the users' satisfaction,
- sustainable livelihood security evaluated from users' future prospects about their livelihood.

(6) The overall performance of institutions evaluated by using the design principle of long-enduring CPR institutions (after Ostrom, 1990, discussed in detail in chapter 2):

- clearly-defined boundaries and users of watershed,
- congruence between operational rules and local conditions,
- collective-choice arrangements,
- monitoring,
- graduated sanctions,
- conflict-resolution mechanisms,
- recognition of rights to organize,
- nested enterprises.

B. Household level. The variables at the household unit of analysis though drawn from the same concepts as those at the community level are different in the method of measurement and evaluation. Sources of data for these variables are from

the knowledge, attitudes, and practice of the interviewee (mostly the head of the household) through interviews using the questionnaire as a tool. In the peasant community of Northern Thailand, the smallest unit of decision-making seems to be the household, and the head of the household is the one who makes decision. Some variables are constant within the same community but vary between different communities. These variables are mainly the physical and technical attributes of watersheds. The list of variables are described in Table 4.1.

Table 4.1 List of variables at the household level

Variable code	Variable name
V.1	community site
V.2	forest subtractability
V.3	water subtractability
V.4	land subtractability
V.5	minor forest products subtractability
V.6	excludability
V.7	indivisibility
V.8	size of watershed area
V.9	distance of watershed from community
V.10	scarcity of forest
V.11	scarcity of water
V.12	scarcity of land
V.13	scarcity of minor forest products
V.14	education level of the head of household
V.15	highest level of education in the household
V.16	major occupation of household
V.17	secondary job
V.18	annual household income
V.19	paddy rice yield per rai
V.20	paddy field holding size
V.21	tenureship of paddy field
V.22	upland holding size
V.23	tenureship of upland
V.24	orchard holding size

Table 4.1 (continued)

Variable code	Variable name
V.25	tenureship of orchard
V.26	status in Muang Fai group
V.27	status in BAAC and co-operative group
V.28	status in other social groups
V.29	participation in monitoring
V.30	participation in maintenance
V.31	participation in meeting
V.32	conception about the commons
V.33	recognition of local institutions
V.34	acceptance of rules
V.35	making and amending the rules
V.36	congruence of rules
V.37	government intervention in rule making
V.38	government's recognition of rules
V.39	conflict resolution mechanisms
V.40	knowledge about legal status of watershed
V.41	cooperation
V.42	opportunism
V.43	free riding
V.44	the reason for breaking the rules
V.45	motivation for watershed protection
V.46	dependence on wood and timber
V.47	dependence on fuelwood
V.48	dependence on water resource
V.49	dependence on cultivated land
V.50	dependence on minor forest products
V.51	party most responsible for deforestation
V.52	trend of agricultural-based occupation
V.53	livelihood change in the community
V.54	vitality of watershed protection
V.55	change in local control over the watershed
V.56	change in the government roles
V.57	trend of threats from outside the community
V.58	selling out land
V.59	seeking new farmland
V.60	satisfaction about rate of resource use
V.61	satisfaction about equity of resource use
V.62	satisfaction about sustainable livelihood
V.63	factors threatening to the institutions
V.64	recommendation on local institutions

4.2.3 Methods of Data Collection and Field Work

This research makes use of the advantages of both qualitative and quantitative techniques of data collection in the field settings.

(1) *Qualitative methods.* Several methods were used to collect qualitative data including interviews, participant observation, informal discussions, and some historical records of Tambon Council meetings. The guidelines for interview and observation were assembled as a handbook (see Appendix 1). The principal informants include the leaders of the community, the members of the decision-making committee, the senior citizens of the community, and officials. These methods of data collection were mostly undertaken in an informal manner. Tape recording was used with the consent of the informants.

(2) *Survey method.* Surveys were undertaken when the researcher had become acquainted with the village for a period of time. The questionnaire was designed to be a tool for undertaking structured interviews (see questionnaire in Appendix 2). The questionnaire was developed and pre-tested in 7 households in Ban Paa Lan, Amphoe Wiang Chai, Chiang Rai province. The purpose of the pre-test was to check the accuracy of the questions. In actual surveys, more than one probe question was asked to obtain the answer for each item. Thus the questionnaire provided rather a loose framework for gathering the appropriate information. Interviews were conducted without time limit and a rich text of qualitative as well as quantitative information was obtained.

Household sampling was undertaken during the field stay in each community. The normal process entailed using house registration numbers as the sampling frame, then selecting households systematically. The researcher and his assistant visited each selected household to conduct the interview. Fortunately, most cases were successful in the first visit because the field work began during the off-season period when the villagers mostly stayed home.

Since this study placed special emphasis on institutional arrangements at the community level most effort was spent on gathering data at this level, including the participant observation and group discussions. The sample size in each community was decided by the timeframe of the field work and accessibility of an area rather than statistical calculation. The total household sample was 306 (Table 4.2).

Table 4.2 Number of household samples and population frame in each community

Community	Household	Sample	Percent
Ban Luang	2,755	106	4
Silalaeng	1,231	86	7
Thung Khao Hang	157	66	42
Ban Pae	86	48	56
Total	4,229	306	7

The first field acquaintance began when undertaking the feasibility study in February 1992. The actual field work began in late February, and lasted until July 1992. The researcher and his assistant lived in the villages for most of this time. It

was also necessary to spend some period of time in the watershed forest in order to assess the physical attributes of the watershed resources. The researcher also participated in activities concerning the management of the watershed to observe the patterns of interaction and decision-making arrangements, including monitoring by foot patrols with a group of monitors in the watershed forest of Silalaeng, village meetings in Thung Khao Hang and Ban Pae, and maintenance of the watershed forest in Ban Pae.

Field work in this particular study was an interactive process between the researcher and the real-world situation of the community settings. The researcher had to maintain a "theoretical sensitivity"⁶ with the data in order to make comparisons with the conceptual framework, and initiate constant analysis and interpretation. At the end of each day the researcher recorded daily activities in a notebook. This record was useful in data analysis especially for the qualitative data.

4.2.4 Data Analysis

Data analysis consists of examining, categorizing, tabulating, or otherwise recombining the evidence, to address the questions posed by the study. Qualitative data and survey data were processed by different methods.

(1) *Qualitative data.* Qualitative data were sorted and categorized for each variable related to the concept. Then the data were interpreted, conceptualized, and assembled together. Analytical aids including diagrams and matrix were used to

demonstrate the relationships among the variables. This is the central process by which theories (grounded theories) are built from empirical data. It is important to understand that in qualitative approaches data collection and data analysis are tightly interwoven processes, and may occur alternately because the analysis directs the selection of data.

(2) *Survey data.* Quantitative data from the survey were processed by coding all text information into numeric data in order to be computerized by the Statistical Package for Social Science (SPSS). In this study, the statistical analysis was done by SPSSPC Plus software, using a personal computer.

It is noted here that in an analysis at the household level (unit of analysis) a set of physical and technical variables (V.2 to V.13) were held constant within the same community because all users are supposed to share the same watershed. Thus the community site (V.1) was used as the surrogate variable to represent a set of physical and technical variables in analysis at the household level for the reason that selection of the communities was mainly based on their differences in physical and environmental aspects in the first place. Data collected for these variables by questionnaire interview were used to supplement an assessment of physical and technical attributes in analysis at the community level.

Overview, this study consisting of two units of analysis employed both qualitative and quantitative methods of data collection. At the community level, participant observation, group discussions, and interviews were mainly used to gather all data required. Field surveys by interviews with questionnaire were used to collect

data at the household level. Analysis of qualitative data involved iterative interactions of comparison and interpretation between data and conceptual framework. Survey data were analyzed by using the applicable statistical techniques.

Summary

This chapter functions as a bridge between the theoretical propositions in the previous chapters and the empirical evidence in the field settings to be discussed next. The modified conceptual framework has presented sets of variables, the relationships among them, and the application as an analytical instrument for the study of community-based watershed management in Northern Thailand. The research method conveyed the tasks of transforming the conceptual framework into research activities, including defining the units of analysis, identifying the variables, and demonstrating the method of data collection and data analysis. The results and findings of this study will be presented in the next four chapters (Chapter 5, 6, 7, and 8) followed with conclusion in Chapter 9.

Notes

1. The original model was adopted by the Panel on Common Property Resource Management, organized by the Board on Science and Technology for International Development (BOSTID) at the U.S. National Research Council, and used as a framework to organize the presentation of twenty case studies at an International Conference on Common Property Resource Management held at Annapolis, Maryland, in 1985. The proceedings of the conference were published by the National Academy Press (National Research Council, 1986).

2. Ostrom (1990: p.191) criticizes the use of models that they do not tell the analyst how to discover the structure of the situation in order to conduct an analysis. Models that use assumptions such as complete information, independent action, perfect symmetry, no human errors, no norms of acceptable behavior, zero monitoring and enforcement costs, and no capacity to change the structure of the situation itself guide the analyst to obtain precise predictions. Models that make such assumptions do not, however, direct the attention of the policy analyst to some of the problematic variables of the situation that affect the incentives and behaviours of individuals.

3. Ostrom (1990) also points out that the frameworks that relate the whole families of models together also provide an important part of the theoretical foundation for policy analysis, because they point to the set of variables and the types of relationships among variables that need to be examined in conducting any theoretical or empirical study of a particular type of phenomenon. A framework does not produce a precise prediction, but suggests the questions that need to be asked to clarify the structure of a situation and the incentives facing individuals. Once the incentives are clarified, researchers can analyze a situation and predict likely behavior and the consequences that are likely to result. Oakerson (1992) also tends to use the term "framework" instead of "model" in his latest revised article - Analyzing the Commons: A Framework.

4. A situation in which it is impossible to make some people better off without making others worse off. This criterion of economic efficiency, devised by V.F.D. Pareto, may be applied to efficiency of resource allocation. Optimality is achieved when it is impossible to reallocate resources to produce an outcome that would increase the satisfaction of some people without reducing the satisfaction of others (Johnston *et al.*, 1989). Oakerson (1992) suggests that it is more useful to attempt to identify Pareto-efficient changes, that is, improvements in efficiency, rather than to identify a Pareto-optimal condition from which no further improvement is possible.

5. Feeny (1982) has documented institutional change in economic development of Thailand from 1880 to 1975 using historical economic data to analyze the process of change and its effects. The opening of the rice market to world trade, after the

Bowring Treaty was signed in 1855, induced institutional change in land. The increase in land price led to an increase in the demand for more systematic procedures for defining property rights in land.

6. Theoretical sensitivity refers to a personal quality of the researcher. It indicates an awareness of the subtleties of meaning of data. The degrees of theoretical sensitivity of researchers can vary from one to another depending upon previous reading and experience with, or relevant to, an area. It can also be developed further during the research process. Thus having theoretical sensitivity means the attribute of having insight, the ability to give meaning to data, the capacity to understand, and capability to separate the pertinent from that which is not (Strauss and Corbin, 1990; more detailed in Glaser, 1978, and Glaser and Strauss, 1967).

Chapter 5

The Watersheds

Watershed problems are often more critical in developing countries where population growth and rising expectations of people are placing intense pressure on scarce land, forests, and other related resources. These problems result from a combination of biophysical, socio-economic, cultural, and institutional factors (Dixon and Easter, 1986). Management of watersheds has often not been successful, partly because the concentration of both policy and implementation has been almost exclusively on a single aspect such as biophysical or technical aspects for example without proper regard for socio-economic and institutional aspects and the linkages between upstream and downstream communities (Blaikie, 1985; Gibbs, 1986). Moreover, the capacity of local communities in managing watershed resources, until recently, has not been fully recognized and advocated by the government (Magrath and Doolette, 1990).

This chapter attempts first to examine some basic definitions, concepts, and perspectives of watershed management shared among scholars and watershed managers. Second, the watersheds in the four selected communities are examined in terms of their physical and technical attributes by using the concepts outlined in the conceptual framework.

5.1 Concepts of Watershed Management

A watershed is "a topographically delineated area that is drained by a stream system. The watershed is a hydrologic unit that has been described and used both as a physical-biological unit and as a socio-economic and socio-political unit for planning and implementing resource management activities" (Easter and Hufschmidt, 1985: p.1). Geographically, it is a complex system within which natural and human factors interact (Briones, 1985). Each subwatershed is delineated as a subunit of the watershed through the "level of integration" concept (Figure 5.1). In this manner, the watershed is regarded both as part of broader system (i.e., a river basin) and as a unifying system itself, incorporating numerous lower level subwatersheds (McNamara, 1984).

There are advantages and disadvantages in using a hydrological (watershed) unit, an administrative (political) unit, or a set of villages (social unit) as planning units at the local level. However, it is quite common that the boundaries of the village community frequently coincide roughly with watershed boundaries because the villages tend to be situated close to drainage lines in order for their occupants to exploit arable lowland as well as less-fertile upland.

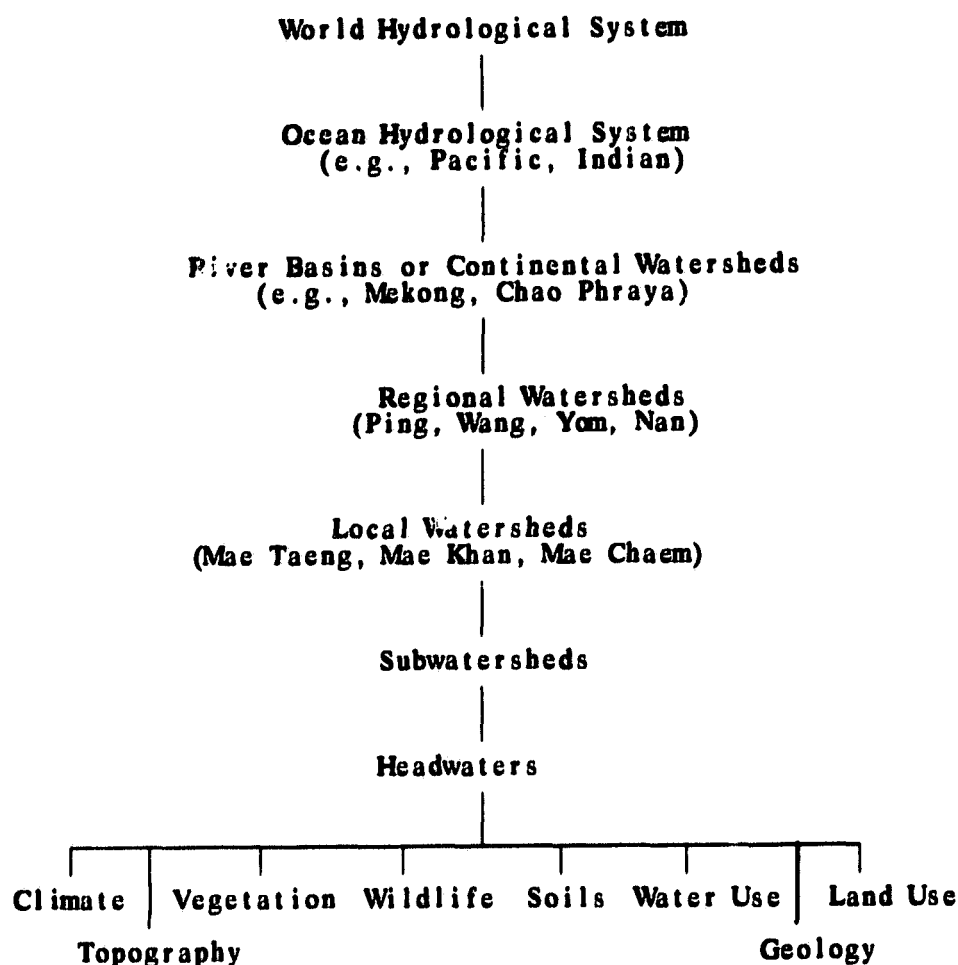


Figure 5.1 Hydrological system and levels of integration of the watersheds
(adapted from McNamara, 1984: p.35)

According to Magrath and Doolette (1990), a typical watershed (100,000-200,000 ha) in Southeast Asia comprises of a series of subwatersheds (5,000-15,000 ha) which in turn are made up of 5 to 10 microwatersheds (500-2,500 ha). Magrath and Doolette (1990) suggest from their experience that the "subwatershed", as it is defined above, is a convenient planning unit provided that plans respond to an

aggregate of information from constituent microwatersheds.

A river basin is similarly defined as a watershed but is of a large scale such as the Mekong river basin, Amazon river basin, or Chao Phraya river basin in Thailand (Easter and Hufschmidt, 1986).

Integrated watershed management is "the process of formulating and implementing a course of action involving natural and human resources in a watershed, taking into account the social, political, economic, and institutional factors operating within the watershed and the surrounding river basin and other relevant regions to achieve specific social objectives" (Easter and Hufschmidt, 1986: p.5).

The watershed approach is the application of integrated watershed management, as defined above, in the process of planning and implementing resource management and rural development projects or as part of a such process for specific resource sectors such as agricultural, forestry and hydro-power electricity. The watershed approach intrinsically embraces the linkage between uplands and lowlands in both the biophysical and socio-economic contexts (Easter and Hufschmidt, 1986). Thus, the watershed approach is, though closely related, distinguished from social forestry approach because of its focus on the water-related linkages between upstream and downstream (Gregersen *et al.*, 1989).

The rationale for using a watershed approach to resource management and rural development can be summarized as follows (Easter and Hufschmidt, 1985: pp.4-5; Dixon and Easter, 1986: p.6):

1. The watershed is a functional region established by physical relationships.

2. The watershed approach is logical for evaluating the **biophysical linkages** of upland and downstream activities because within the watershed they are linked through the hydrologic cycle.
3. The watershed approach is **holistic**, which enables planners and managers to consider many facets of resource development.
4. Land-use activities and upland disturbances often result in a chain of **environmental impacts** that can be readily examined within the watershed context.
5. The watershed approach has a **strong economic logic**. Many of the externalities involved with alternative land-management practices on an individual farm are internalized when the watershed is managed as a unit.
6. The watershed provides a framework for analyzing the effect of **human interactions** with the environment. The environmental impacts within the watershed operate as a feedback loop for changes in the social system.
7. The watershed approach can be **integrated with or be part of** programs including forestry, soil conservation, rural and community development, and farming system.

Because of the physical and hydrological linkages between the uplands and lowlands, the watershed becomes a natural geographic area that is well defined and constitutes a "neat" unit for planning and analysis (Dixon and Easter, 1986), and is useful in identifying the environmental impacts within the watershed and the feedback loops in an input-output system (Dearden, 1992). Many of the impacts, which would have been external to traditional project analyses or ignored in project planning, are accounted for when the watershed approach is used (Dixon and Easter, 1986)

In summary, a watershed as a physical and social unit is a fundamental unit

for resource management. Watershed management is considered as an integrated process whereby a natural resource system is managed in conjunction with the social system to produce a series of goods and services for the welfare of human society and the sustenance of the ecological system (Lovelace and Rambo, 1985). In this regard, watershed management must explicitly take into account the range of biophysical, social, economic, and institutional factors that result in the observed pattern of resource use (Dixon and Easter, 1986). In the social science context, the watershed approach has emerged as a logical unit of policy making and management (Ciriacy-Wantrup, 1975).

5.2 The Watersheds in the Four Communities

A watershed in this study refers to the "bundle" of resources including all resources in the watershed system, such as the forests, water, soil and minor forest products. In general terms, uses of watershed resources may include hydroelectric power, irrigation, timber, grazing, agriculture, recreation, and food gathering. In this study, however, due to the small scale of the watersheds, resource use is mostly limited to timber, fuelwood, water source, cropland, and minor forest products. The minor forest products may include vegetables, wild fruit, bamboo shoots, mushrooms, medicines, honey, rattan, thatch¹, and similar products. Regardless of the rules of each community forest, patterns of use of the watershed resources may vary from one community to another depending on physical and technical constraints of a specific

watershed. Furthermore, physical and technical constraints can influence the variation of rules imposed on different community watersheds. This relationship will be brought into discussion later.

Although it is not possible for this study to assess quantitatively the physical and technical attributes of the given watersheds it has attempted to assess these physical conditions through the view of the community members regarding their watersheds combined with the judgement of the researcher during the field work.

5.2.1 Subtractability of Watershed Resources

All common property resources fall into a broad range of partial subtractability (Bromley, 1989). Subtractability may vary in terms of degree, volume, and frequency of use. Watershed resources are subject to be jointly used by eligible users in the particular community. Although every resource unit, whether a cubic metre of water, tree, plot of land, or bundle of vegetable appropriated by an individual user is subtracted from the whole watershed system, the degree or rate of subtractability may vary among different watershed forests depending on the stock of the resources. Most watershed resources by nature are renewable or replenishable. If the rate of appropriation does not exceed the rate of replenishment the degree of subtractability can be minimal or zero.

In the case of Ban Luang, the vast area of the forest (158,536 rai) makes it difficult to visualize the rate of subtractability from individual use in a short time.

Although this study cannot identify exactly the threshold at which the rate of use of the watershed resources begins to subtract from the watershed system, from the villagers' point of view, the degree of subtractability of the forests is almost none to their knowledge. Almost all of the respondents in Ban Luang feel that to conserve the available forests is more than enough to have the forests available for the next generation; they see no need to reforest if they appropriate the forest for subsistence consumption. As a result, it appears that the uses of the watershed forest in Ban Luang are loosely regulated as long as those uses are for living, and not for accumulation of wealth. In fact, fellow villagers usually cooperate in appropriating trees for house building which includes cutting down, hauling from the forest, and putting up the structure.

Water for irrigation is traditionally managed by the water user groups which have existed for decades before the community-based watershed management was formed. Forest clearance for shifting cultivation is prohibited because this activity depletes the watershed forest. Minor forest products are more or less free-open access for the villagers of Ban Luang.

In Silalaeng, the watershed forests are mainly regenerated from areas once cleared for shifting cultivation. Individual and cumulative use tends to subtract significantly from the whole watershed forest system. The degree of subtractability is thus higher than that of Ban Luang. The villagers of Silalaeng are able to comprehend the physical conditions of their watershed forest by their common knowledge and experience. If unchecked, the decline of the forest will surpass the

threshold of carrying capacity in a short period of time. To sustain the jointness of watershed uses and reduce the degree of subtractability of forest, Silalaeng therefore requires strict control of appropriation. Timber harvesting for house building is therefore limited by quotas. Collecting fuelwood is allowed only from dried wood and litter. Water for cultivation as well as for domestic uses has a high degree of subtractability if mismanaged. Water resource management, however, is concerned more with the flow and distribution of the resource rather than the whole stock. In fact, water management is well established in terms of both physical and management structures.

In Silalaeng, upland cropping in the watershed forest has not been allowed since the very beginning of the community-based watershed management (CBWM). Clearance of forest areas for agricultural land is considered as the major factor contributing to the high rate of forest depletion. Use of minor forest products is less controlled than other resources since the nature of their consumption tends to be limited to household subsistence.

Thung Khao Hang, although surrounded by forests, has a high degree of subtractability of watershed resources because its designated headwaters are relatively small (2,000 rai). The forest types are mixed with dry mixed-deciduous forest dominated by bamboo. Teak (*Tectona grandis*) was found at lower elevations (600 metres MSL). The watershed forests are strictly preserved for headwater purposes only. The main concern at Thung Khao Hang is on water supply rather than on timber harvesting because the villagers depend on the stream water for their rice

cultivation during the rainy season and domestic use during the dry season. The villagers use the pipe lines to bring the water from the creek into the storage tank before being distributed to the households in the village. This system is commonly known in Northern Thailand as *Prapa Phukhao* or literally translated as "mountain tapped water". The same kind of mountain tapped water systems, also used in some villages of Silalaeng, are widely built under the budget from the National Rural Development Program (*Kor Chor Chor*). In Thung Khao Hang, the villagers obtain their basic necessities - timber, firewood, grazing land, minor forest products - from the vast areas of forest outside the protected headwaters. The availability of forest outside the designated conservation area helps absorb the pressure of the high degree of subtractability from the headwaters so that the designated headwater forest can be closed from appropriation for periods of time. The villagers of Thung Khao Hang, like everywhere else, treat the forests outside the designated headwaters as more or less open-access, although they are recognized as national reserve forest. A similar situation was also found among the villages (e.g. Ban Don Sai) in Amphoe San Khamphaeng, Chiang Mai province (TDRI, 1990).

In the case of Ban Pae, the degree of subtractability from use of the watershed resources is the highest among the four selected communities whether it is in terms of the timber, water, land, or minor forest products, since its watershed forest is very small (446 rai). The rate of natural replenishment cannot keep up with the rate of use and unlike Thung Khao Hang there is no forest nearby Ban Pae to substitute for the demands on the watershed resources. Thus the villagers have to

turn to alternative resources outside the community. They tend to build houses from concrete or brick instead of wooden material; they turn to gas or buy fuelwood and charcoal from the city market; and they use lignite for tobacco barns instead of firewood. Ban Pae also obtains water supply from the Mae Pha Haen reservoir during peak demand periods.

In summary, the watersheds are characterized by a continuum subtractability. The degree of subtractability of each watershed involves its size, resource endowment, the richness of the forest, and the rate of use. The critical point of subtractability in the watershed is the threshold at which the rate of use exceeds the rate of replenishment of the resource system.

5.2.2 Excludability of the Watershed Resources

In the same manner as subtractability, the possibility of exclusion or degree of excludability varies from one watershed to another depending upon the physical aspects of a given watershed. By the very nature of the commons, it is difficult to exclude the shared users from using the watershed because of its indivisibility. Exclusion of outside users may, to some degree, be possible varying from one community watershed to another.

In Ban Luang, the huge watershed area and large number of users make it more difficult to exclude the users on an individual basis. Thus the Ban Luang watershed, by its nature, presents a low degree of excludability among its co-users.

The degree of excludability, however, varies in each Tambon depending on its location, and each flexibly applies its own rules according to location. For example, Tambon Fah, with the surrounding mountain and only one way to access the forest, has high degree of excludability for outsiders, and has devised stronger rules of appropriation than the others.

When it comes to the matter of exclusion of those outside the community, the watershed boundaries offer some degree of excludability since the Ban Luang watershed boundaries are physically delineated along the watershed divide of the surrounding mountains. These physical boundaries, when reinforced by the rules of community watershed forest and the monitoring of community members, have allowed some degree of excludability. Ban Luang has experienced outside threats and strongly opposed any exploitation from the outside community.

Silalaeng also has a large watershed area which by its nature makes it almost impossible to exclude members of the community from exploiting the watershed resources. What makes the degree of excludability on an individual basis within Silalaeng more practical than that of Ban Luang is the rules imposed by the community not the intrinsic physical aspects of the watershed itself. However, some physical attributes such as location and close proximity of watershed forest area to the village also help increase the possibility of excluding outsiders. The watershed forest is in the range of 1-3 kilometres from the community and the roads to access the watershed area have to pass through the villages (see Figure 3.4). Non-members of the community intruding into the watershed area can be easily noticed. Besides,

in every day life, the villagers usually roam the watershed forest to collect minor forest products or look after their cattle grazing in the forest area. These activities help monitor the behavior of other users. The local people mostly know each other so that they can easily identify who are outsiders invading the watershed forest.

In the case of Thung Khao Hang, the physical and technical attributes of the watershed forest may not, by themselves, help exclude individual users from outside the community gaining access to the forest since the designated headwater area is embedded in the national reserve forest area. For the villagers from outside communities, it may be difficult to visibly distinguish the designated watershed forest area from the rest of the forest areas because of the physically unclear boundaries. For villagers within the community, the possibility of excluding individual users from entering the protected headwaters is possible because the villagers know exactly the area designated as the protected headwaters. They use the water channel and the parallel mountain ridges to mark the physical boundaries of the headwaters.

The Ban Pae forest offers a high degree of excludability of outsiders because the physical aspect of the forest area is clearly distinguished from the surrounding landscape. That is, while the watershed forests comprise of old growth forests with valuable trees like teaks, the surrounding area is secondary forests dominated by dry dipterocarps. The small size of the forest and its proximity also provide some advantages for community members to monitor the activities in the forest. Technically, it is possible to erect a fence round such a small forest area (446 rai), if it is necessary. The villagers maintain the fire break along the boundary lines of

the forest every year before the dry season begins.

5.2.3 Indivisibility of Watershed Resources

Naturally and conceptually, it is impossible to divide watersheds held in common into small portions, and allocate to each individual co-user. However, at some scales, a watershed may be divisible. As mentioned earlier in Section 5.1 the watershed, as a hydrological unit, can be divided into several subwatersheds and microwatersheds, each of which is delineated by a topographic divide. The fact that community boundaries often coincide roughly with watershed boundaries make it possible to divide the watersheds to be owned and managed by the local communities. In this sense, the watersheds have some degree of divisibility, particularly on the community scale, but not on an individual scale.

In Ban Luang, although the physical boundaries of the watershed area are clearly delineated along the topographic divide, the overall watershed area is too large to be managed at the local community level. In practice, Ban Luang divides its watershed forest into sub-unit areas and gives priority to those areas to be preserved as headwaters, community forests, crop lands, and grazing areas. The headwaters and riparian zones are given the highest priority to be protected from appropriation. Except for the major headwaters and riparian zones, the other areas were arbitrarily managed by each Tambon. The rights and duties of enforcement are delegated to the Tambon and villages in close proximity to, and dependent on, those sub-unit areas

delineated by the Tambon boundaries.

Silalaeng delineates its watershed boundaries along the topographic divides that drain water to three water courses in its watershed area (see Figure 3.4). The watershed boundaries separate the Silalaeng watershed forest from the Doi Phuka National Park. In addition, Silalaeng has erected concrete poles to mark the boundaries shared with Tambon Phuka since the H'tin sometimes clear the forest for shifting cultivation intruding into the watershed area of Silalaeng. Unlike Ban Luang which divides its watershed forest into sub-units to be managed by the Tambon and villages, Silalaeng tends to manage its watershed forest as a holistic unit under the authority of the Tambon Council.

In the case of Thung Khao Hang, its protected forest boundaries are delineated along the mountain ridges that enclose the forest area of a micro-watershed. In comparison with the surrounding forest area, these protected headwaters are small. The total area of protected forest is estimated at 2,000 rai. Although they have never measured the exact size of this protected watershed forest, all the villagers recognize where the boundaries are. Outsiders and the neighbouring villagers may not know or recognize the self-demarcated boundaries of this protected forest. The village committee has thus attempted to publicise the existence of the protected watershed forest to their neighbours and put up signs to mark the site of the designated forest area.

Ban Pae's protected watershed forest with its area of 446 rai is physically distinguished from the surrounding forest area by its lush and rich forest, especially

teak. The long and successful history of this protected forest has helped protect it from outside intrusion. Moreover, the government has publicly recognized and approved the right of the village to manage this protected forest. A forestry official from the regional office has recently surveyed the protected area and found that there are 446 rai, not 800 rai as originally claimed by the village. The protected forest of Ban Pae is adjacent to a national reserve forest and legally part of it. However, the protected watershed forest is physically divided from the rest of the forest areas by the distinguished condition of the vegetation.

In summary, watershed resources cannot be physically and technically partitioned among individual users, yet it may be feasible to divide them at some scale to be jointly used by a group of people or community. As found in this study the local communities usually use the watershed boundaries to divide the watershed forests for the management units which most often coincide with their community boundaries. This also happened in the case of common land in Japan where land was divided into pieces for a group of co-users. They did not have ownership, and had to substitute rules for physical constraints (McKean, 1992).

5.2.4 Size, Scarcity, and Proximity

These three interrelated physical attributes of watersheds can either accommodate or constrain the management of watersheds as common property resources. A large watershed endowed with plentiful resources can absorb a degree

of subtractability but may not be able to exclude other potential users. If the watershed resources are scarce, competitive uses are likely to be intense. Consequently, free riding and rule breaking incidents tend to increase. Eventually, the watershed system will be degraded and the management regime of local institutions will be vulnerable to collapse. Proximity of watershed forest can affect the degree of excludability to the extent that the watershed forest close to the community increases the degree of excludability for it is easy to notice and monitor the activities in the forest.

Ban Luang has an area of watershed forests of more than 150,000 rai which are endowed with virgin forest. Although more than a third of this forest has been destroyed in the past decades the remaining forests are sufficient to support the basic needs of Ban Luang users if sustained-yield management is carried out effectively. The large area of watershed forest in turn creates difficulties in excluding non-member users. Monitoring the behavior of the co-users is not an easy task in such a large area, and is costly. The principal headwaters are located about 5-6 kilometres from the community centers. This proximity makes it difficult to notice any wrong doing in the forest, and for the decision makers to respond instantly. There are still a number of free riding activities such as logging and forest clearance for dryland cropping.

For Silalaeng, the forest area of 60,625 rai seems to be an appropriate size for the Tambon of 1,231 households, when compared with other community forests found in this region. Yet, in terms of resource endowment, the condition of the forest

is less plentiful than that of Ban Luang because most of the upper watershed is secondary forest, recently regenerated from shifting cultivation less than 25 years ago. The rate at which subtractive use degrades the watershed system is closer to the threshold in comparison with that of Ban Luang. For this reason, Silalaeng needs rules to control the rate of use and tough penalties for rule breakers. Proximity of the watershed forest is about 1-2 kilometres from the community. Exclusion and monitoring in Silalaeng is more efficient and practical than that of Ban Luang when reinforced by the effective rules and enforcement.

Thung Khao Hang is the most resource poor of the four communities. Its designated watershed area (approximately 2,000 rai) has few valuable trees and other necessary resources. The stream does not provide enough water to meet the basic needs of the community - neither for agricultural nor domestic use. Appropriation of resources in the designated watershed forest may be completely banned sometimes to allow replenishment. The villagers therefore substitute their needs for watershed resources from the forest areas outside the designated watershed area. The designated watershed forest area is located 3 kilometres from the village.

Ban Pae, with a small forest area of 446 rai, cannot afford to use its watershed forest for anything else except as a source of water and some limited minor forest products. Although its forest is lush with valuable teak, this small piece of forest area cannot provide enough resources for the needs of community members and maintain sustained yields at the same time. The villagers of Ban Pae have adjusted their livelihood to the limited watershed resources by seeking nonresource-oriented jobs

in the city instead. Their livelihoods have gradually shifted from land-bound activities to nonland-bound activities, according to Faichampa's (1990) observation. The Ban Pae watershed forest is close to the village (500 metres).

The close proximity of the watershed forest in Ban Pae, and Silalaeng to a lesser extent, contributes to the strength of their community-based watershed managements, especially in terms of excludability. This finding confirms the conclusion that "if people lived in close relationships with a relatively small common-pool resource system over a long period of time, they have probably evolved some system to limit and regulate use patterns (Ostrom, 1992: p.313)".

Overall, size, scarcity, and proximity of the watersheds are closely related to degree of subtractability, excludability, and scale of divisibility of the specific watersheds. The large size and richness of forest in Ban Luang help absorb subtractiveness but create difficulties for exclusion. Close proximity of the watershed forests in Ban Pae and Silalaeng facilitates the possibility of exclusion. Small size and close proximity of the watersheds to the villages offers high potential for an evolution of collectively-organized rules within the community.

In summary, each community watershed is characterized by a variation of six physical and technical attributes summarized in Table 5.1.

Table 5.1 Summary of physical attributes and technological feasibility to make use of the watershed in each community

Physical and technical attributes	Ban Luang	Silalaeng	Thung Khao Hang	Ban Pae
Degree of subtractability	low	moderate	high	very high
Degree of excludability	low	high	moderate	very high
Indivisibility (boundary)	not clear	clear	not clear	very clear
Size	very large	large	medium	small
Scarcity of watershed resources	less	moderate	high	very high
Proximity to the community	distant	close	distant somewhat	very close

Note

1. The peasants use imperata grass (*Imperata cylindrica*) to make the roof of the house, especially among the poor who cannot afford the tile or zinc roof.

Chapter 6

Socio-Economic Characteristics of User Communities

According to the relationships between the components in the conceptual framework (Figure 4.1), it was hypothesized that selected socio-economic characteristics of the local communities as well as individual attributes of the users affect decision-making or choice of action in the use of watershed resources. Socio-economic characteristics are in turn constrained by physical and technical attributes of the watershed resources. Important variables are discussed in this chapter.

6.1 The Number of Users

The number of users or appropriators who have equal rights to access the shared watershed varies from one community to another. The users are usually all members of a specific community. In the peasant communities of Northern Thailand, the individual unit of decision-making tends to be at the household rather than personal level. Therefore, any decision making in CBWM that requires an individual vote, contribution, or allocation is mostly based on the household unit not the number of persons in the household. This can be seen in village meetings and cooperative activities such as repairing weirs, digging canal, and monitoring the

watershed forest, which are usually counted by household unit. In common property terms, these households are theoretically entitled to the resources of the community watersheds. The number of users in each community of this study is shown in Table 6.1.

Table 6.1 The number of users and sizes of watershed areas in the four communities

Community	Number of users (households)	Size of watershed (rai)
Ban Luang	2,755	158,536
Silalaeng	1,231	60,625
Thung Khao Hang	157	2,000
Ban Pae	86	446
Total	4,229	221,607

According to previous studies (e.g. The National Research Council, U.S.A., 1986; Wade, 1988; Ostrom, 1990) it was hypothesized that a small number of users was likely to form and maintain the collective action organization in managing the common property resources. Feeny (1992: p.272) states that "if a group is smaller, all other things being equal, it should be less costly for members of the group to recognize each other and so easier for the group to detect rule infractions by group members and entry into the commons by nongroup users." In addition, the cost of decision making and coordination of activities could similarly be related to group size. Olson (1965), though pessimistic about collective action, made an exception for the small group. However, none of these scholars indicate exactly the number of

users in the small group. The small group was rather qualitatively defined in terms of noticeability among members within the group (Wade, 1988).

In the case of Ban Luang, during the early period of CBWM development, the whole community was strongly united because they used to be the same Tambon and shared a common experience in the struggle to save the watershed forest from a logging concession. Most of the heads of households were involved in that rebellious action. However, at the present time, the large number of users combined with the large area of watershed forest makes it difficult to reach consensus in decision making. Enforcement of rules, coordinating, and monitoring is less effective and more costly because there are so many users. Sometimes it is difficult to tell who is an eligible user and who is an outsider. The relationships among different Tambon are somewhat distant because the villagers tend to be more obligated to their village community than to the Ban Luang community as a whole.

Silalaeng also has a large number of users, however, since its unity of institutional arrangements is stronger under a single Tambon Council, it has fewer problems in decision making than that of Ban Luang. Nonetheless, the simple logic regarding the number of users is that the larger the number of users the smaller the shares in the watershed resources. It means that a large group of users compete to assert their rights on a limited resource. In such a situation the community needs effective rules to control the rate of use in order to ensure the sustained yield of watershed resources and guarantee equal shares among the members of community.

Both Thung Khao Hang and Ban Pae have small numbers of users so that

their decision-making arrangements are simple because every member knows each other. The villagers are able to observe the behavior of their fellow villagers. In the peasant community of Northern Thailand, the village community may contain less than 100 upto 300 households. However, the important essence of the village is not at the number of the household itself but rather the relationships among the villagers in the territorial and social organization unit that affects the decision-making arrangements in the use of the watershed. In this sense, the village community is a discrete entity of corresponding physical and social boundaries (Hirsch, 1991).

Some demographic factors (size, composition, and change) of the resource users, as mentioned elsewhere in this study, may also affect the management of watersheds as common property resources. These factors include occupation (Section 6.4), level of education (Section 6.6), population growth rate, and migration. Although no data is available in these particular communities, except for Ban Luang, the annual growth rate of population in these rural areas is reported as low as 1 percent (NESDB, 1992). The average household size is also reduced, for example, in Ban Luang household size is 4, in Silalaeng 5, in Thung Khao Hang 4, and in Ban Pae 3. The immigration in these communities is mainly occurred by matrilocal marriages. The emigration from these communities to the cities is mostly seasonal, however, some who find permanent jobs in the cities may never return. Although the vertical migration between different zones was not found in significant numbers in these four communities, this incident has been currently experienced by the watershed residents in similar environments in the North (Tan-Kim-Yong *et al.*, 1988).

Therefore, in addition to the direct effects on subtraction and exclusion in the use of the commons, a large number of users affect the complexity of decision-making arrangements and collective action. The small size of user group in the community-based watershed management is significant in terms of enabling members of the community to notice and monitor the behavior of each other. Drastic changes in demographic factors may affect watershed resources in terms of share and dependency.

6.2 Land-Use Patterns

Land use can be classified into three major types of agriculture which are closely related to the dependency on watershed resources: sedentary wet-rice field, dryland cropping, and orchard; or simply known in Thai as *Thi Na*, *Thi Rai*, and *Thi Suan* respectively. Each type is discussed in turn.

6.2.1 Paddy Field

Sedentary rice cultivation is not only the livelihood for people in the lowland valleys of the North; it is a culture. Wet-rice cultivation requires much water and needs an organized system for water allocation, distribution, and maintenance. The traditional irrigation system (widely-known as the *Muang Fai*¹ system) has been both technologically and institutionally developed for centuries in the Upper North. Every

year before the rainy season starts, weirs (*Fai* in Thai) are repaired and canals (*Muang* in Thai) are dredged in preparation for the growing season. These jobs are organized by the *Muang Fai* groups or water user groups. In the past, weirs were made of wood and bamboo which were easily destroyed during peak season overflows. Nowadays, most weirs are constructed of concrete which lasts longer. Thus the *Muang Fai* groups in modern times tend to deal mainly with water allocation and management rather than repairs.

Rice cultivation proceeds through three stages, sowing, transplanting, and growing. When it starts raining in June, the farmers plough and harrow in a plot of fields soaked with water to prepare a seedbed for sowing. When the rice seedlings are about 30-45 days old, they are ready to be transplanted to another plot and left for about 30-45 days before once again being transplanted to grow in the rice fields. In some cases, the second stage may be skipped because of time constraints or late rain in some years. Reciprocal labor exchange is widely practiced in the jobs that need pooled labor in a short period of time such as growing and harvesting. In some areas where water is available all year round the second and third crops may be grown to earn extra income. Generally, the farmers grow glutinous rice (*Khao Nao*) for consumption and ordinary rice (*Khao Chao*) to sell (for more details see Moerman, 1968; Ganjanapan, 1984). Data from the total household survey of 306 cases shows the distribution of paddy field holdings (Table 6.2).

Table 6.2 Land holding size of paddy fields

Land holding	Percentage	Cases
landless	15.0	46
less than 3.00 rai	40.5	124
3.00-5.00 rai	24.5	75
more than 5.00 rai	20.0	61
Total	100.0	306

The small size of suitable lowland forces the peasants to practice intensive cultivation (multiple cropping) where water is available. Many must also cultivate less arable land which in turn requires a cooperative system of water maintenance due to the uneven slope of the land and limited water sources during off-season. Most of the farmers hold less than 5 rai of paddy fields (Table 6.2). The average paddy field holding per household in each community is shown in Table 6.3.

Table 6.3 Average land holding of paddy field in each community (unit: rai)

Communities	Mean	SD	Cases
Ban Luang	4.71	4.39	94
Silalaeng	3.82	2.46	78
Thung Khao Hang	3.93	4.13	58
Ban Pae	5.10	3.07	30
Total (exclude landless)	4.31	3.71	260

The variation of land holding size among the communities is, however, not statistically significant. These figures are far less than average farm size in the Upper

North in general (6 rai, in Van Der Meer, 1981; see also figures in Table 3.3) because these communities, unlike the core areas in the larger river basins, are situated in small watersheds with little lowland available. This small size of rice fields is unable to yield enough rice for household consumption, especially in households of more than 6 persons².

Rice yield per rai is measured in *Tang* which is the equivalent of 20 litres or approximately 10 kilograms. In some localities in the Upper North, rice yield is measured by *Thang* (basket) which is about 30 litres. In this study, rice yield is standardized in *Tang*. Average rice yields per rai vary considerably among the different communities (Table 6.4). This variation is statistically significant (ANOVA, $F = 38.45$, $P < 0.001$). The average rice yield per rai in the North is 41.5 tang (Office of Agricultural Economics, 1989). Factors contributing to high yield include soil quality, sufficient water, variety of rice, and fertilizer inputs.

Traditional rice cultivation is largely dependent on nature. Manure from cows and buffaloes is used in the fields that yielded low productivity in the past year. The use of chemical fertilizer, however, has been increasing. Farmers tend to invest in chemical fertilizer in areas that are well irrigated rather than those at risk through drought or flood. Overall, sufficient water was the most important factor in variation of rice yield among the four communities since none of them complained about soil quality during interviews. In general, rice yield per rai in the North is higher than other regions mainly because of fertile soil in the lowland valleys (Arbhabhirama *et al.*, 1988). Furthermore, with limited paddy fields, the farmers usually try harder to

increase yield per rai to meet consumption needs in their households. Their efforts include improvement of soil fertility and using high yield varieties.

Table 6.4 Average rice yield per rai in each community

Communities	Mean	SD	Cases
Ban Luang	40.91	17.70	91
Silalaeng	69.26	25.29	78
Thung Khao Hang	48.53	14.42	53
Ban Pae	61.83	12.15	29
Total	53.64	19.26	256

Improvement of rice yield is important for these farmers to relieve the pressure of meeting their household consumption rather than to generate cash income. The improvement of soil fertility can be undertaken on an individual basis by investing more fertilizer but assurance of sufficient water for rice fields needs collective action in maintaining the flow of water from the headwaters. This leads to the formation of community-based watershed management.

After rice harvesting in December the paddy fields in which water is available are used for second crops such as tobacco, peanut, soybean, chili, vegetables, garlic, onion, and rice. In Ban Luang, second crops were found in some villages in Tambon Pi, Suad, and Paa Kha Luang. These areas were estimated to cover less than 20 percent of the whole area of paddy field of Ban Luang.

In Silalaeng, after rice harvesting, the lowland paddy fields are cultivated intensively by a variety of cash crops including chili, garlic, onion, cucumber, wheat,

tobacco, peanut, tomato, and soybean. More than 60 percent of the paddy fields in Silalaeng are irrigated in the dry season. Some households grow triple crops a year. These cash crops provide the major income for the household.

Thung Khao Hang is the most impoverished area among the four communities in this study. The paddy fields are left deserted after wet rice harvesting since there is not enough water to grow second crops. A few households grow second crops such as garlic, onion, peanut, and soybean but only for household consumption.

In Ban Pae, the second crop is mainly tobacco which is grown after rice harvesting in January. Some households convert their rice fields into tobacco plantations because they can earn much more money than growing rice. These particular cases occur among the relatively rich households who have their own curing barns. They also buy fresh tobacco leaves from small farmers who do not have their own curing barns. The rich farmers later resell the dried tobacco leaves to the manufacture with the added-value price.

6.2.2 Upland Cropping

The limited area of lowland in the watershed valleys forces some peasants to turn to rainfed cultivation in the less fertile uplands. This has resulted in widespread encroachment of forest land in the North. Cultivation on the uplands, and highlands to a lesser extent, has become an alternative for villagers who: have no paddy fields in the more fertile lowland valley; have not enough paddy field to produce rice to

feed the family; or want extra income from cash crops. This system of swidden agriculture practised by *Khon Muang* is known as a "partial" system which could be either supplementary or incipient swidden farming according to Conklin's (1957) classification of swidden systems (also see Chapman, 1978; Van Der Meer, 1981). In the past, villagers acquired their cultivated upland from the forest lands by slash-and-burn practices, not yet regulated by community rules, but rather treated as open-access (Hirsch, 1990a). At present, further encroachment in watershed forests is prohibited by the community rules.

Upland-cultivated areas of the northern Thai (*Khon Muang*) may occupy areas ranging from undulating terrain and gentle slopes to steep slopes at higher elevation, but they are mostly at the low-altitude end of the swidden spectrum - below 1,000 metres. For villagers who have no paddy fields, the upland crop is mainly dryland rice (*Khao Rai*) for their household consumption. For the others, in the past, the uplands provided vast areas for cash crops such as maize, tapioca, cotton, sesame, mungbean, peanut, and vegetables.

Shifting cultivation was not uncommon among these communities since almost three-fourths of the total respondents from the interview used to practice swidden agriculture. Currently, shifting cultivation practiced among these communities is declining significantly. Apart from the community rules prohibiting shifting cultivation, there are many reasons that deter *Khon Muang* from this cultivation technique. First, productivity is declining because of too short a fallow period and in many cases no fallow period at all. The farmers are forced to cultivate on the same

plot of land since there are no more forest lands to rotate. Second, the uncertainty of the market and falling prices of cash crops discourages farmers from investing their labor in the uplands. Third, the villagers are offered better choices from wage employment in their own community, in the city, and even abroad.

Although the villagers who used to practice shifting cultivation tend to give up, they still hold their best plot of land in the upland areas for permanent ownership. The uplands with good soil quality, low elevation, gentle slope, short distance from home, and close to water source are likely to be kept for permanent holding. The farmers tend to change the pattern of land use in these uplands into fruit tree gardens (*Thi Suan*) and invest in levelling, fencing, and stump removal. These farmers also expect that someday they can acquire the titlement which will make these lands more valuable in the market for land speculation.

From the survey data in the four communities, about 25 percent of the total respondents have never had lands in the upland area, and more than 50 percent have less than 5 rai of the upland areas (Table 6.5).

Table 6.5 Size of land holding in uplands

Land holding	Percentage	Cases
no upland holding	25.20	77
less than 3.00 rai	35.30	108
3.00-5.00 rai	16.30	50
5.01-10.00 rai	11.40	35
more than 10.00 rai	11.80	36
Total	100.00	306

The average land holding of upland is about 5 rai per household in the four communities. The average holding size of the upland varies significantly among the four communities as shown in oneway analysis of variance (ANOVA) in Table 6.6 ($F = 18.18, P < 0.001$).

Table 6.6 Average land holding of upland in each community

Communities	Mean	SD	Cases
Ban Luang	6.97	4.30	89
Silalaeng	5.06	4.20	67
Thung Khao Hang	2.61	2.17	48
Ban Pae	2.78	1.50	25
Total (exclude landless)	5.04	3.70	229

Having little upland, unlike paddy field, was constrained by available labour, cash investment in the household, and less prospective returns rather than by the limited area itself. Traditionally, all work in upland cultivation was done by the members of the household rather than hired labour or machinery. Exchange labour might be used in exceptional circumstances. Tractors might be hired for the first plough and to remove the stumps. At present, these upland cultivators still grow cash crops such as peanut, soybean, corn, tobacco, and vegetables, to earn cash income. Each year they try to plant more fruit trees in their uplands. Such fruit trees are banana, tamarind, orange, lychee, mango, and longan. Some rich farmers have permanently transformed their uplands into fruit tree plantation for long term benefits.

In Ban Luang, an average land holding of upland is about 7 rai per household. The villagers have been requested to stop shifting cultivation especially in areas close to the headwaters and the riparian zone. Although they are capable of further encroachment on forest lands the farmers choose not to expand their upland holdings because most of the young laborers have turned to jobs in the city instead of the backbreaking work in upland cultivation where the yield barely covers the labor costs. Most of the farmers claim that they have held their present upland for 10 consecutive years without rotation or being left vacant.

Despite its less attractive economic returns, upland cultivation still offers a safety valve for land pressure in the lowland valley in Ban Luang and many peripheral areas in the Upper North. Moreover, for people who have no alternative local employment, upland cultivation bears low opportunity cost of labor for them. It is smoothly integrated with wet-rice cultivation in terms of timing of labor requirements. Besides, dryland rice is ready for harvesting at the time when most farmers are just about to run out of rice for consumption (Chapman, 1978).

Silalaeng has an average land holding size in the upland of 5 rai per household. These upland holdings are supposed to be permanent because the community rules on watershed forest conservation prohibit shifting cultivation completely. In fact, Silalaeng's watershed forest used to be covered with a vast area of swidden agriculture practiced by both *Khon Muang* and the hilltribe minorities. The strong determination of the water user groups and charismatic leaders has convinced their fellow villagers to stop swidden agriculture for the sake of sustainable

use of watershed resources, but not without resistance in the first campaign. In some villages such as Ban Sala which has many landless households, the village committee has allocated upland areas to these farmers to cultivate the upland crops especially dryland rice. These upland areas belong to the village. The tenants pay low fees for utilization of these upland areas. The upland holdings in Silalaeng generally occupy gentle slopes at the foot of the hills adjacent to the paddy field in the lowland (Figure 3.4).

Thung Khao Hang has an average upland holding of 2.6 rai per household. Upland cultivation in this village is mainly self-sufficient using household labour. Despite the fact that the villagers could acquire more upland from the surrounding forest areas they tend to look for other alternatives that offer high income such as wage labour and jobs in manufacture at the industrial estate, in Lamphun.

Ban Pae was allocated a plot of upland through the Forest Village Project operated by the RFD in the 1970s but this project was unsuccessful because the soil quality was not suitable for cropping and there were little water. The farmers used to grow sugar cane and tobacco on these uplands. The sugar cane faded out a few year later because the nearest sugar factory is about 100 kilometres away. Tobacco is still grown in these upland areas but productivity is lower than that grown on the paddy fields.

6.2.3 Orchard

The small portion of land allocated for fruit trees is generally for subsistence. Orchards (*Thi Suan*), in these rural communities, are not a pattern of land use that yields enough product for an economic base. However, the surplus, if any, can be sold in local markets. Traditionally, fruit trees are planted on the spare lowland adjacent to the residences for convenience in looking after and picking for daily consumption. Overall less than 30 percent of the respondents from the household survey have an orchard, mostly less than 5 rai (Table 6.7). The average size of orchard per household in each community is shown in Table 6.8.

Table 6.7 Land holding size of orchard

Land holding	Percentage	Cases
2.00 rai and less	56.70	51
2.01-5.00 rai	31.10	28
5.01 rai and more	12.20	11
Total	100.00	90

Table 6.8 Average land holding for orchard in each community

Communities	Mean	SD	Cases
Ban Luang	4.67	6.54	37
Silalaeng	2.27	1.91	27
Thung Khao Hang	2.30	1.78	21
Ban Pae	2.70	1.99	5
Total	3.27	4.55	90

Most of the orchard lands belong to the rich farmers. Areas with fruit trees are increasing in the former upland cropping areas as well as in the lowland. Investment in fruit tree cultivation offers more promising profit in the long run. Moreover, fruit tree lands have high potential in the land development business, especially as a country house for the growing middle-class life style. Lands with fruit trees also help to prove the intention of permanent utilization which in turn helps convince the authorities to grant a land certificate.

In Ban Luang and the Province of Nan in general, oranges have gained acceptance among the farmers for many years. The farmers have expanded orange plantations into the upland areas because of the promising market in the region. In Silalaeng, especially in the three villages of hilltribe resettlement, the fruit tree plantations in the uplands have paid off enough to compensate for the abandonment of swidden cultivation. Thung Khao Hang and Ban Pae do not have significant trends in fruit tree plantations for income generation.

It is obvious that the shortage of suitable lowland forces some farmers to cultivate on less arable upland for their living. Over time, increasing numbers of farmers and rate of resource use in the uplands have destabilized the watershed system through upland-lowland interrelationship in both the biophysical and socio-economic aspects. Sedentary wet-rice cultivation has suffered most from the watershed degradation since its water supply depends on a healthy upper watershed. Rice farmers have pressed their community to impose rules to regulate use of watershed resources.

6.3 Land Tenure

Population growth and agricultural development are the prime forces in the evolution of land rights (Feeny, 1982; Feder *et al.*, 1988). Security of rights in land needs not only recognition by the social custom but also an effective legal system guaranteed by the state. Land tenure is generally governed by law and enforced by the state authority. In the Thai legal system of land rights, a variety of land certificates define the different rights on land as summarized in the following categories:

NS.4 or *Chanod*. Legal possession is documented in a full, unrestricted title deed. It enables the owner to sell, transfer, and legally mortgage the land. It is issued on the basis of an accurate ground survey, with clear identification of the land by stone boundary marks, and is registered in the provincial land registrar.

NS.3 (*Nor Sor Sarm*) and NS.3K (*Nor Sor Sarm Kor*). These documents³ are "certificate of use" or "exploitation testimonial". NS.3 and NS.3K certify that the occupant has made use of the land for a prescribed period. Under the existing law, a villager must first possess NS.3 or NS.3K document before he/she can apply for a the NS.4. By law, sale, mortgage, and other transfers are allowed with the use of these documents to record the transaction.

NS.2 (*Bai Chong*). This "preemptive certificate" authorizes temporary possession of land. It is not transferable except by inheritance, and therefore not accepted as legal collateral. It grants the validity of the rights on the condition that

it is used within six months of its issuance. At least three-quarters of the land must be utilized for a prescribed period before the occupant can convert the NS.2 to the NS.3 and NS.3K.

SK.1 (*Sor Kor Neung*). This "claim certificate" was not defined in the Land Code of 1954 but was issued during the process of implementation of the law. "It allowed for a claim to be made within a specified period after enactment of the code, by any person who had possessed and had made use of land prior to the effective date of the law" (Feeder *et al.*, 1988: p.15). This document is convertible to the NS.3 and NS.3K or to the NS.4.

Apart from the documents described above, some special certificates of land tenure found in some specific areas are **PBT**. (*Por Bor Tor*), **STK**. (*Sor Tor Kor*), and **SPK**. (*Sor Por Kor*). The PBT is not a document of land rights. It is a mere tax certificate showing that the farmers have paid the land tax (*Pasi Bam. song Thongthi*) collected on most occupied land whether it is occupied legally or not. Many farmers have mistaken the PBT as a kind of land certificate. They are apparently willing to pay this low-rate land tax with the expectation that someday it will help them to obtain the full legal rights. This land tax is often collected from the squatters in the national reserve forests which in turn makes the squatters believe that the government will certify their occupation of lands.

The **STK** is a usufruct certificate issued by the RFD since 1981 to squatters in the forest reserves. This certificate provides "temporary cultivation rights" in land holdings up to 15 rai. The conversion of the certificate to title deed (NS.4) or

certificate of use (NS.3 and NS.3K) is prohibited. The transfer of holding can be done only by inheritance. The violation could cause revocation of usufruct rights by the state (the RFD). The hidden agenda of the STK program is that the RFD wants to maintain its jurisdiction over the degraded national reserve forest so that it can keep its substantial budget and staff, otherwise the jurisdiction over land, budget and staff may be shifted to other agencies such as the Agricultural Land Reform Office (Mehl, 1990). The SPK is similar to the STK in terms of status and restrictions but issued by the Agricultural Land Reform Office (ALRO) to farmers in the areas of the program.

In the Thai legal system, only NS.4, NS.3, and NS.3K allow the holders to transact freely and legally with a given tract of land. Accordingly, this study following this system considers NS.4 (*Chanod*), NS.3 (*Nor Sor Sarn*), and NS.3K (*Nor Sor Sarn Kor*) as the secure tenureships and the rest as insecure tenureships. There is much difference between these documents and the STK because possession of the latter does not help the farmers to gain more access to institutional credit so that it does not increase the holders' sense of security in land tenure and will not positively affect their incentive to invest in their lands to improve productivity (Feder *et al.*, 1988).

Survey results overall show that the majority of respondents (73 %) have *Chanod* and NS.3 and NS.3K for their paddy lands. In contrast, land tenure for the uplands is dominated by the less secure ownership certificates since the uplands are mostly acquired from invasion of forest land owned by the state. Meanwhile land tenures for orchard, with 26.67 percent non-certificate ownership, vary considerably

depending on the location. The orchards usually obtain land titlements similar to those of the paddy fields if it is in the lowland area (Table 6.9).

Table 6.9 Percentage of land tenure in each land use pattern

Land tenure	Paddy land	Upland	Orchard
Chanod	25.77	6.55	15.56
NS.3 and NS.3K	47.69	14.41	20.00
SK.1	6.92	9.60	13.33
PBT.	15.00	26.24	22.22
STK.	-	1.31	2.22
SPK.	-	1.75	-
no certificate	4.62	39.74	26.67
Total	100.00 (260)	100.00 (229)	100.00 (90)

It seems to be the typical pattern of land tenure in rural areas of the North that the lowland paddy fields (*Thi Na*) usually obtain the more secure ownership forms whereas the uplands (*Thi Rai*) occupying the state-owned forest lands have no certificate in most areas, or if any, are the land tax certificate (FBT) or special issuances such as STK and SPK. Land tenures of the orchards (*Thi Suan*) are, however, mixed depending upon where they are and how they are acquired.

It is noted here that in the area of study there is little rented land because no single household owns more than 30 rai of paddy fields according to the survey data. The farmers usually farm their paddy fields themselves, or sharecrop with their children. Tenancy is usually concentrated in the core areas especially in the Chiang

Mai-Lamphun Basin (see more details in Van Der Meer, 1981; Cohen, 1983; Ganjanapan, 1984).

When compared among the four communities, the patterns of land tenure are significantly different from one another. For the paddy fields ($\chi^2 = 74.56$, $P < 0.001$), almost all respondents in Ban Pae, Thung Khao Hang, and Silalaeng have secure land tenures - either *Chanod* or NS.3 and NS.3K. In Ban Luang, however, only 42.6 percent of respondents have secure land ownership (Table 6.10).

Table 6.10 Percentage of land tenure in paddy field, by community

Land tenure	Ban Luang	Silalaeng	Thung Khao Hang	Ban Pae
Chanod, NS.3 or NS.3K	42.6	85.9	93.1	100.0
the others	57.4	14.1	6.9	-
Total	100.0	100.0	100.0	100.0

Land tenure for the uplands also differs significantly among the four communities ($\chi^2 = 30.72$, $P < 0.001$). Ban Luang has only 3.4 percent of respondents having secure ownership (Table 6.11). The villagers reported that many residential areas were classified as national reserve forest, including the area occupied by the branch district office and other government services. In some cases, the villagers claim that they have occupied and made use of the lands before the RFD declared these lands national reserve forest.

Table 6.11 Percentage of land tenure in upland, by community

Land tenure	Ban Luang	Silalaeng	Thung Khao Hang	Ban Pae
Chanod, NS.3, or NS.3K	3.4	38.8	25.0	28.0
the others	96.6	61.2	75.0	72.0
Total	100.0	100.0	100.0	100.0

Orchard lands located in the lowland near the residences are usually registered for land certificates in the same manner as paddy fields and residential property. Among the four communities, the percentages of respondents with secure ownership are significantly associated with different communities ($\chi^2 = 25.58$, $P < 0.001$) as shown in Table 6.12. These percentages indicate that most orchards in Silalaeng, Thung Khao Hang, and Ban Pae are in the lowland areas.

Table 6.12 Percentage of land tenure in orchard, by community

Land tenure	Ban Luang	Sila'aeng	Thung Khao Hang	Ban Pae
Chanod, NS.3, or NS.3K	8.1	40.7	71.4	60.0
the others	91.9	59.3	28.6	40.0
Total	100.0	100.0	100.0	100.0

It is shown above that the percentages of secure land tenure of all land-use patterns are significantly associated with the community site. The periods of settlement are involved in this pattern of association, the old communities usually

obtain secure land tenure whereas the new communities situated in the national reserve forest are considered squatters. The remoteness of the community also plays a part in variation of land tenure because the secure land titlement needs to be administered at the provincial land registrar.

The important issues in land tenure are not only about the security of the rights in land but also, and perhaps more important, the legal transfers in land transactions - sales and rentals - or use as collateral for credit. Most of the farmers want to have more secure land certificates to make their land more valuable in transactions rather than to prevent the risk of eviction, or for security *per se*. In fact, until recently, eviction of squatters from the forest reserves by the government has rarely occurred because of socio-political sensitivity. Moreover, public services and infrastructure provided to the squatters as well as land tax collection reflect a sort of recognition by the government in *de facto* rights on lands. This has made the squatters less worried about the possibility of eviction.

However, recent actions of the government on watershed protection and reforestation in the Northeast, the infamous *Kor Jor 'Thor*⁴ program, does cause concern among the farmers about the rights in lands, especially those with the less secure land certificate and those without documents at all. Some villagers also extend their concerns to the rights they enjoy in the community watershed forest.

In summary, the four communities are older settlements which have occupied the lowland areas for many generations. Land tenure is secure in the lowland areas. The confusion in land tenure often occurs in the upland areas acquired through

encroachment in the reserve forests. The villagers want to have a secure land titlement not only for the security of ownership *per se* but also (perhaps more important) for obtaining high values in market transactions of the lands.

6.4 Occupation

The livelihoods of the people in local communities are closely related to the land use patterns and depend upon the watershed resources. The major occupation in the four communities is farming, principally rice cultivation. More than 85 percent of respondents overall are involved in wet-rice cultivation as the economic base for their living. Rice cultivation alone, however, is not sufficient to generate income for their living, and in many cases rice yields are barely enough for household consumption. This is the reason that more than 56 percent of farmers from the survey earn their living from a combination of rice cultivation and cash-crop production. Fifteen percent earn their living from a combination of rice cultivation, cash crops, and fruit tree products. There are only 8.8 percent of respondents that live on wet rice cultivation only. The main factor is the small size of paddy field holdings in these communities, as mentioned earlier. These characteristics of occupation are similar in all the four communities being studied. Ban Pae, however, has a higher percentage of respondents having wage labor as the major occupation (Table 6.13).

Table 6.13 Percentage of major occupations of households in each community

Occupations	Ban Luang	Sila- eng	Thung Khao Hang	Ban Pae	Total
rice only	2.8	5.8	16.7	16.7	8.8
rice + crop	56.6	67.4	53.0	43.7	56.9
rice + orchard	6.6	3.5	9.1	-	5.2
rice + crop + orchard	21.7	13.9	15.2	2.1	15.0
crop + orchard	1.9	1.2	1.5	-	1.3
crop only	8.5	7.0	1.5	12.5	7.2
wage labour	-	1.2	-	20.8	3.6
others	1.9	-	3.0	4.2	2.0
Total	100.0	100.0	100.0	100.0	100.0

Throughout the historical development of CBWM in the four communities, it appears that the rice farmers have been the prime movers in formulating institutional arrangements for watershed protection. This is because their means of living will be threatened most if the watershed resources deteriorate further. The rice farmers who are the majority of the community override the smaller number of reluctant shifting cultivators in the initiative to impose rules on the use of the watershed resources, and subdue the resistance from a small group of vested interests such as illegal loggers and timber traders.

Limited land holdings and the scarcity of watershed resources force the villagers to seek second jobs to fill the gap between their actual income from their main occupation and the rising costs of living. Over 64 percent of respondents overall

have second jobs, mainly wage labor within the local community as well as in the city, and some itinerant trading in the locality (Table 6.14). Ban Pae has a lower percentage (54.20 %) of respondents with a second job than other communities because some households consider wage employment as a permanent job, as mentioned above.

Table 6.14 Percentage of households involved in secondary jobs in each community

Secondary jobs	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	36.80	36.00	24.20	45.80	35.30
yes	63.20	64.00	75.80	54.20	64.70
Total	100.00	100.00	100.00	100.00	100.00

The tendency of young men and women to seek jobs in the city has grown in recent years. These second jobs in wage labor, sometimes providing more income than the main occupation, have functioned as a safety valve for the pressure on land and watershed resources. In the past, the villagers considered the watershed forest as their source of necessities and income after the harvesting season ended. They headed to the forest for everything that they could make money from, ranging from timber, fuelwood, charcoal, vegetables, hunting, and a variety of minor forest products. Nowadays, young labor heads to the city instead.

It was not uncommon to find only the elderly of the household and the children at home during the field survey. The rapid growth of the industrial and service sectors in the past decade has absorbed much of the labor from the

agricultural sector in rural areas. In Ban Luang, the sons and daughters of this community have gone to work as far away as Phuket, in southern Thailand. Many of them get permanent jobs and do not return home during the rainy season. They may instead send money to their parents to hire local labourers to do the rice cultivation. In Silalaeng, some young couples shut down their house and go to work in Bangkok after finishing rice harvesting.

In Thung Khao Hang, as many as 25 young men and women have gone to work in gem manufacturing in Bangkok where they can earn as much as twice the income they would obtain in local wage labor. People who stay home earn their extra income from making bamboo twist ties (*Tok*) used for tying the bundles of rice straw before threshing it, or otherwise used for tying bundles of garlic, onion and vegetables during harvesting season. Most of the customers are from Amphoe Li and Ban Hong - the downstream communities - where most of the farmers are involved in intensive cash-crop cultivation. The villagers usually appropriate the bamboo from the surrounding forest, and at certain times the designated watershed forest is opened for appropriation of the bamboo.

In the case of Ban Pae, its location helped to diversify the second job opportunities both within and outside the community. There are 9 tobacco curing barns in the village that employ a number of wage labourers. Recently, four households have become engaged in dairy farms which seems to offer promising economic returns. Many villagers go to work in Chiang Mai city and Bor Sarng-San Khamphaeng manufacturing estate.

In summary, the occupation of the people in the four communities is mainly rice cultivation which is largely dependent on water from the watersheds. Rice cultivators, concerned about degraded upper watersheds, influence the invention of the rules to protect the headwaters leading to the formation of community-based watershed management in these communities. At the same time, the means of living are diversified by job opportunities in the localities as well as in the cities which in turn helps to reduce pressure on the watershed resources by absorbing surplus labor from the local communities.

6.5 Income

Annual income per household was calculated from the income in cash plus the value of rice yield but did not include income in kind acquired from self-sufficient food production and food gathering from the forest. Thus income per household in this study might be somewhat lower than the actual income in economic terms.

The variation in income among the communities is statistically significant (ANOVA, $F = 6.36$, $P < 0.001$). Ban Pae has the highest income with an average of 58,738 baht per household. In this village there are a few households which earn extremely high income from tobacco curing barns and one household earned extra income from selling property. This can be observed from the Standard Deviation (SD) of Ban Pae's average income (Table 6.15). Ban Pae also has a higher rate of wage than other communities. Silalaeng has an average annual income per household

of 37,018 baht. Most of the income in Silalaeng comes from various cash crops in intensive cultivation. Thung Khao Hang, with an annual income of 22,185 baht, also generates cash income from bamboo products and employment outside the village. Ban Luang is at the bottom of the group with an average annual household income of 15,986 baht (Table 6.15). The villagers of Ban Luang rely on agriculture-based income which is mainly from upland crops such as maize, peanut, mungbean, and tobacco. These crops in turn rely on the rain which fluctuates year by year. The price of these crops also varies considerably in the local market.

Table 6.15 Average annual household income in each community

Communities	Mean	SD	Cases
Ban Luang	15986.50	17193.26	106
Silalaeng	37017.91	31387.90	86
Thung Khao Hang	22185.45	19984.43	66
Ban Pae	58738.21	141953.01	48
Total	29940.48	61579.17	306

It is very difficult to calculate the exact income of rural households, especially from survey data, because accurate data depends on the memories of the interviewee. Most of the rural people do not keep records of their income. Besides there are many items of income in kind such as food from the kitchen garden and basic necessities from the forest. The annual income per household in this study may not be comparable with the income from other sources of statistics based on income per

capita. Nevertheless, the average annual income of the people in these communities is far below the per capita income of the country which was 32,028 baht in 1989 (NESDB, 1992). The per capita income of the North in the same year was 18,928 baht (Table 3.6 in Chapter 3). Income disparity is a typical feature in Thailand whether it is local, regional, or national.

Cash income has increasingly become a vital part of the local economy when the market economy penetrated into the once subsistence economy. Rising costs of living and higher expectations force the local people to struggle to earn more cash income to buy goods and services produced from outside the community. The local economy has become more and more dependent on the outside market system. Sources of income have diverged from one crop (rice) to various crops influenced by market demands, and to sectors other than agriculture. Diversified economic activities and interests in the local communities will be discussed in detail later in Chapter 8.

6.6 Education

Education was measured in terms of years of schooling, and it was found that more than 70 percent of the heads of households have 4 years or less schooling (Table 6.16). This can be explained partly by the numbers of years of compulsory education when most of these people entered school, which was only grade four. Other main reasons are the needs of the labour force on the farm and also the

accessibility of education. The high cost of higher education forced the children out of school earlier because parents could not afford to send them to a school that was far away from the local community. This pattern of education is characteristic in all four communities.

Table 6.16 Years of schooling of heads of household, all communities

Years of schooling	Percentage	Cases
less than 4 years	23.5	72
4 years	70.9	217
more than 4 years	5.6	17
Total	100.0	306

The shift in level of education can be observed from a comparison between the number of years of schooling of the head of household (Table 6.16) and the number of years of schooling of the persons who have the highest level of education in the household (Table 6.17).

Table 6.17 Years of schooling of persons who have highest education in the household, all communities

Years of schooling	Percentage	Cases
4 years and less	22.2	68
5-6 years	39.9	122
7-9 years	24.5	75
10 years and more	13.4	41
Total	100.0	306

The change in level of education among the younger generation is partly because the level of compulsory education has been upgraded. Other factors contributing to this change include increasing aspirations, requirements for higher education in the non-agricultural work place, and expansion of high-level schools to the locality. Many young men and women strive for higher education as a path to escape from poverty in the rural areas.

The change in level of education of the villagers will affect the degree of dependency on watershed resources, in the sense that the people with higher education tend to pursue off-farm employment rather than agricultural-based occupations which depend more directly on healthy watersheds.

6.7 Social Affiliation

Social affiliation here is defined as being a member of an organized group. Group membership indicates involvement in collective actions within the community. It is an important foundation for the formation of community-based watershed management. These groups can be an indigenous group such as the *Muang Fai* or water user groups, organizational groups such as the Bank of Agriculture and Agricultural Co-operative (BAAC) groups and the Agricultural Co-operative groups, or the other state- or NGO-organized groups such as a housewife group, youth group, and village scouts.

This study pays special attention to the *Muang Fai* group, the BAAC group

(also known in Thai as *Klum Thor Kor Sor*), and the Agricultural Co-operative group (*Klum Sahakorn Kamkaser*) because they are the groups that need reciprocal actions from the members. In fact, most of the CBWMs were initiated by the water user groups.

From the overall survey, it was found that 60 percent of the respondents were members of the *Muang Fai* group (Table 6.18). For the BAAC group and the Agricultural Co-operative group, almost 50 percent of the respondents belong to one or either of them. For other social groups, in rural communities today almost all households are somehow involved as a member of a social group because there are now so many organized groups under government-planned community development programs as well as those initiated by NGOs. About 45 percent of the respondents belong to one of these organized groups (Table 6.18).

Table 6.18 The percentages of group membership, all communities

Membership	<i>Muang Fai</i>	BAAC/Co-op	Others
none	40.8	51.0	54.9
member	57.2	48.3	22.5
committee	0.7	0.7	21.9
leader	1.3	-	0.7
Total	100.0	100.0	100.0

Some villagers found themselves being a member or even a committee member of the group without really knowing their role. Participation in these organized groups is not necessarily voluntary in every case; many government-organized groups are

instrumental for the expansion of state authority in local polity. More detailed analysis of these aspects are given in Turton (1987; 1989) and Hirsch (1990b).

Differences exist between the four communities. Silalaeng has the highest percentage of member in all social groups and especially in the *Muang Fai* group ($\chi^2 = 53.17, P < 0.001$, Table 6.19). The reason for this is that most of the lowland area in Silalaeng is well irrigated and the irrigation system has been continuously developed. The villagers largely depend on the irrigated water for their year round cropping.

Table 6.19 Membership of *Muang Fai* group, by community.

Membership	Ban Luang	Silalaeng	Thung Khao Hang	Ban Pae
no	34.9	17.4	74.2	50.0
yes	65.1	82.6	25.8	50.0
Total	100.0	100.0	100.0	100.0

Ban Luang also has strong water user groups, however, because of sparse paddy fields some areas do not have access to water allocation. Thung Khao Hang is different in the way the *Muang Fai* system is organized since the water source is small and the paddy fields are irrigated in the rainy season only. The water user group is informally organized in small groups ranging from 5 to less than 20 members. When asked about membership, many villagers do not consider themselves to be an organized group.

The water user group in Ban Pae has played the major role in preserving the

watershed forest. Since Ban Pae is only a small village, most of the collective activities are operated on behalf of the whole village rather than divided into subgroups. The water user group has been incorporated into the village-based watershed management and all activities of the former water user group shifted to the village committee. While 50 percent of the respondents still consider themselves a member of the water user group, another half think the water user group no longer exists.

For the BAAC and Agricultural Co-operative groups, participation is not open as in the case of other groups, but limited by qualification. These credit groups need joint-liability among the group of six members. Although in principle individual collateral is not necessary, in practice the BAAC and the Co-operative are reluctant to accept landless and very poor farmers. Thus the significant differences in percentage of membership of these groups ($\chi^2 = 36.47$, $P < 0.001$, Table 6.20) in this particular study is also dependent on the availability of these credit services in each local community and socio-economic attributes of the individuals. Both the BAAC and co-operative groups though initiated by the villagers are still under the patronage of government institutions.

Table 6.20 Membership of BAAC or Agricultural Co-operative groups, by community

Membership	Ban Luang	Silalaeng	Thung Khao Hang	Ban Pae
no	56.6	24.4	62.1	70.8
yes	43.4	75.6	37.9	29.2
Total	100.0	100.0	100.0	100.0

Membership of other social groups also varies significantly among the communities depending on the enthusiasm of the villagers on the one hand, and the initiatives of the community development workers from either the state or the NGOs on the other ($\chi^2 = 37.55$, $P < 0.001$, Table 6.21). A common characteristic of these social groups is that they are active in the first year then fade out some years later because of lack of continuity in activities. Some of them may become successful such as the funeral group which developed from the traditional cooperative activities in the rite of passage ceremony.

Table 6.21 Membership of other social groups, by community

Membership	Ban Luang	Silalaeng	Thung Khao Hang	Ban Pae
no	78.3	38.4	42.4	50.0
yes	21.7	61.6	57.6	50.0
Total	100.0	100.0	100.0	100.0

In short, the *Muang Fai* or water user group is the main force that influenced the formation of the community-based watershed management in these four communities. Patterns of collective action and institutional arrangements well developed in the water user group were extended to govern the use of the watersheds. This local institutional development has high potential to become formally institutionalized as long as it responds to the needs of local people.

6.8 Dependency on Watershed Resources

The livelihood of the local communities is dependent on the watershed resources in several types of resource use ranging from timber, fuelwood, source of water, cultivated land, and minor forest products. It was found in the survey that all the communities are to some degree dependent on the watershed resources. Percentages of households in the four communities dependent on each category of resource use are shown in Table 6.22. However, the degree of dependency varies in the different communities and in different types of use (Table 6.23).

Table 6.22 Percentage of households depending on watershed resources in each category, all communities

Categories	Dependent	Independent	Total
timber	70.3	29.7	100.0
fuelwood	82.7	17.3	100.0
source of water	92.8	7.2	100.0
cultivated land	14.4	85.6	100.0
minor forest products	97.7	2.3	100.0

Overall, 70 percent of the respondents still rely on timber from the watershed forest for building houses. More than 82 percent are dependent on the watershed forest for their fuelwood, either firewood or charcoal. The most important watershed use for all communities is as a source of water for the irrigation system feeding the lowland cultivation and domestic use. However, less than 15 percent are dependent

on the watershed forest for their cultivated lands -upland cropping - partly because they are deterred from doing so by the community rules, and possibly because of less attractive economic returns.

Minor forest products, in general, mean non-timber products from the forest. Tropical forests contain various kinds of minor forest products. For some rural communities the minor forest products are even more important to the local economy than timber (Jessup and Peluso, 1986). Although minor forest products such as the bark of the trees, resin, rattan, and honey contribute to the economy of some local communities, in these areas they are not of significant quantity to be commercially exploitable. The minor forest products in this study include mushrooms, vegetables, bamboo shoots, herbal plants, fruits, rattan, thatch, and honey. Most of the villagers usually consider them as the by-products of the forests rather than as vital for their livelihood. The minor forest products are not indispensable for the villagers' livelihood but they are available to appropriate freely.

When the dependency on watershed resources in each category among the four communities is compared some significant differences are found (Table 6.23). Ban Luang has the highest percentage of dependency on the watershed resources in every item. Silalaeng also has a similar degree of dependence on watershed resources as Ban Luang except for the lower percentage for the cultivated lands. Thung Khao Hang also actually has a high degree of dependency on watershed resources, however, it substitutes the needs for timber and fuelwood from the forests outside the designated watershed forest. Hence, the figures given in Table 6.23 do not

represent a clear picture of reliance on watershed resources *per se*.

Table 6.23 A comparison of percentage of households depending on each category of resource uses among communities

Categories	Ban Luang	Sila- laeng	Thung Khao Hang	Ban Pae
timber	89.6	80.2	22.7	-
fuelwood	87.7	88.4	66.7	83.3
source of water	98.1	97.7	95.5	68.8
cultivated land	34.9	3.5	6.1	-
minor forest products	99.1	97.7	93.9	100.0
Average dependency	81.9	73.5	57.0	50.4

Ban Pae, is constrained by the small size of the watershed forest and has no alternative source to provide these necessities, unlike Thung Khao Hang. The villagers of Ban Pae cannot depend entirely on the watershed forest in the same way as those in the other three communities in this study. The villagers are, however, used to restraining their use of the watershed over a long period of time. At the same time, the villagers tend to be less dependent on the watershed resources by turning to non-resource-oriented means of living such as dairy farms, wage labor, and off-farm employment. Nonetheless, they continue to cultivate rice for household consumption and food security, and this has maintained their dependence on the watershed forest as an indispensable source of water supply. The pattern of use of the watershed forest is being transformed to a recreational area or used for reasons

more in tune with an aesthetic urban life style. The villagers collect minor forest products in their leisure time as a supplementary source of food rather than in a desperate need for self-subsistence.

All four communities consider the source of water in the watershed as the most important resource sector, indispensable for the livelihood of members of the communities. They will sacrifice other resources such as timber and upland cultivation just to preserve the headwaters. The dependency of the villagers on the source of water from the watershed forest, on the one hand, dictates the viability of local institutions in the CBWM. The high degree of dependency on watershed for other resource sectors, on the other hand, can possibly be an imminent pressure on the vulnerable institutional arrangements unless alternatives are available as safety valves. Faichampa (1990) suggested 3 scenarios of dependency on watershed forest:

- (1) excessive dependence;
- (2) optimal level of dependence; and
- (3) inadequate dependence.

In scenario 2, CBWM system is likely to be sustainable (see more details and diagram in Faichampa, 1990).

In summary, the dependency on watershed resources is the crucial factor influencing the evolution of the community-based watershed management, and vital to sustenance of it. The watersheds are subject to multiple uses, thus, different groups of people are dependent on the watersheds in different categories. The degree of dependency on the watershed for each item may also vary among the individual

users. However, one category that most of the villagers in the four communities consider indispensable is the use of the watershed for the source of water in lowland cultivation. High dependency on the source of water with less dependency on other categories is the perfect situation where the CBWMs are likely to develop and last longer.

6.9 Demands for Watershed Resources in the Market

Demands for certain types of watershed resources from outside the community can be a temptation to exploit that resource at a rate exceeding the capability to sustain yields. Improving transportation routes make access from the outside community to the local resources easier. The high prices of certain watershed resources, such as timber and some minor forest products, may induce opportunism within the community as well. For example, the demands for the bark of some species of tree in the Mae Khan basin, in Samoeng, Chiang Mai, have caused the over-exploitation and destruction of the trees (Tan-Kim-Yong *et al.*, 1988). The 1989 logging ban by the government, on the one hand, might have helped strengthen the local institutions to be more legitimate regarding the protected watershed forest. On the other hand, it also causes rising demands for timber and other wood products which in turn may make rule breaking worth the risk.

In the case of Ban Luang, the lush forest has for a long time tempted timber traders to extract valuable wood from the forest. The former leaders of the Ban

Luang water user groups reported that they were approached several times with a large amount of money by the plywood company to cooperate in logging, but they refused. Despite both the logging ban and local rules prohibiting commercial logging, incidents of illegal logging and timber trading still occasionally exist.

The situation in Silalaeng is different from that of Ban Luang. Demands for timber from the outside community are less because people are able to get timber and wood products from the lumber stores in Pua district at prices that are reasonable when compared with the costs of the fines which they have to pay if caught by the monitors. The villagers of Silalaeng also choose to acquire lumber and building material from the sawmills rather than request for appropriation from their community watershed forest. Lumber in Pua district is brought in from Laos across the shared border.

Demands for watershed resources from the outside market also affect the small local communities like Thung Khao Hang and Ban Pae as they are incorporated into the larger market system. Market mechanisms are the external arrangements (Oakerson, 1992), which are beyond the control of local institutions in the village community. Demands for resources in the market can be measured by prices or costs incurred. However, for the local community, the need for watershed resources for their livelihood security, especially water resources, cannot be compromised with the short-term benefits from extracting resources for the market. As long as the needs of watershed resources for livelihood security in the local communities overshadow the demands of watershed resources in the market,

community-based watershed management is likely to be maintained.

6.10 Conflicts in the Use of Watershed Resources

The fact that watersheds are comprised of several resource sectors may create conflicts between resource uses. The typical type of conflict is land-use disputes between upstream and downstream areas. The people in upstream areas want to practice shifting cultivation on the uplands and highlands while the lowland farmers want to preserve the forest areas in the highlands as headwaters for their irrigation system. This type of conflict also occurs among the lowlanders themselves. The landless villagers consider upland cultivation as their livelihood, meanwhile the lowland farmers have attempted to institute rules prohibiting shifting cultivation in the uplands. Furthermore, the need to extract trees for house building and timber trading are always in conflict with the need to preserve forest coverage for the headwaters.

In Ban Luang, the conflict in resource use is mostly between the need to protect the forest in the headwater areas and timber trading involving a small, but powerful, group of vested interests in the community, capital owners from outside the community, and local authorities. There is also conflict between the officials who enforce the forest laws and the villagers who cut down the trees to build houses. In fact, it is a conflict between *de jure* rights and *de facto* rights in the watershed forest. In some areas, shifting cultivation is still practiced by landless farmers who have no

other choice to earn their living. Such shifting cultivation is supposed to be only in areas far from the stream channels.

Silalaeng's CBWM has provoked a conflict with the H'tin minorities who occupy the upstream watershed and practice shifting cultivation. The Tambon Council has attempted to settle the dispute by explaining to the H'tin about the need of the villagers in the lowland areas to protect the headwaters. This has been partially successful because the Khamnan of Tambon Phuka is a native *Khon Muang* from Tambon Silalaeng who used to be a member of Tambon Silalaeng Council when it initiated CBWM system. However, the H'tin villagers sometimes clear the forest into the watershed forest of Silalaeng saying that they did not know the boundaries. The Tambon Council therefore erected concrete poles to mark the boundaries, yet some of these poles were reportedly destroyed by the H'tin.

Silalaeng also faced a potential conflict with authority when the RFD prepare to gazette Doi Phuka National Park. However, the Tambon Council managed to avoid the conflict by appealing to the park officials when they began the ground survey to partition the community watershed forest from the proposed park. Conflict in the use of watershed resources within the community is minimal compared with Ban Luang. The people who used to be involved in timber trading have changed their behavior since the rules on the community watershed came into effect. They sold their elephants used in logging and bought trucks to haul construction material supplies such as sand, bricks, and cement blocks for house building which has changed from using timber to concrete. This adjustment has also helped relieve the

tensions in resource use conflict.

Thung Khao Hang faced initial difficulties in resolving the conflict with timber traders from outside the community. However, due to the strong determination of the villagers, outsiders are now kept away from the designated watershed forest. Conflict with the neighbour villages is rare because the surrounding communities are Karen minorities who tend to agree with the idea of community forest, and some of them also initiate their own protected forests. The conflict in resource use within the village is defused by the availability of forest outside the designated watershed forest.

Ban Pae has maintained its good reputation in preserving the watershed forest with minimal conflict. There have been only four disputes throughout the history of the community-based watershed forest, all of them provoked by outsiders.

In summary, resource use conflicts in CBWM have been minimized through trade-offs between conflicting needs resulting in prioritizing resource use in each community. Although water sources are always the first priority in these communities, the other types of resource use may be relaxed according to the physical conditions of the watersheds. This reflects in the variation of rules governing the appropriation of watershed resources among the communities.

6.11 Leadership Skills of the Local Leaders

Leadership skill of the community leader is perhaps more important for CBWM than for any other local community development activities since the leaders

have become both the decision makers and the enforcers of the rules. The historical development of the existing CBWM institutions owed their emergence largely to charismatic leaders with a strong commitment to protecting the community watershed.

Ban Luang's CBWM was initiated by the leaders of the *Muang Fai* groups which are literally known as *Khae Muang* or *Khae Fai*. These *de facto* leaders, or the "elders" (Keyes, 1970), are well respected by the rice farmers whose livelihood depends on the water from the watersheds. When the watershed forests were threatened by commercial logging these leaders led the villagers to revolt against the influential entrepreneurs and the authorities. Meanwhile the formal leaders, *Khamnan* and *Phuyaiban*, tended to lean more toward the position of outside influential people because of their vested interests and official duties. After the confrontation was over, the corrupt *Khamnan* and *Phuyaiban* were replaced by new leaders who sided with the peasants. Some of the *Khae Muang* were chosen to be formal leaders such as the case of *Khamnan Pan Inlee* who remained in the position until his retirement. At present, these *de facto* leaders still have influence among the villagers, especially the rice farmers, even though they are not in a formal position within the local power structure. In fact, their influence is not limited by administrative jurisdiction as those of the *Khamnan* and *Phuyaiban* but rather by watershed boundaries. They are ready to take action if the formal leaders fail to protect the watershed forest. In many cases, the relationships between these *de facto* leaders and the formal leaders and the authorities are not good since the formal

leaders may be involved in timber trading.

Silalaeng's CBWM, unlike Ban Luang, was initiated by the formal leader - Khamnan Muangdee Preedawong - with the cooperation of the village headmen. The Tambon Council (*Sapha Tambon*) has been the most important mechanism since the CBWM institutions began to develop. Khamnan Muangdee Preedawong with his charisma and strong will to preserve the watershed forest persuaded the villagers to give up shifting cultivation and comply with the rules of community watershed forest. When he retired his successor, Khamnan Thawaj Yangyun, also a member of Tambon Council during Khamnan Muangdee's period (1967-1977), continued developing the institutional arrangements of CBWM. The operational rules for the community watershed forest became more established and effective during Khamnan Thawaj Yangyun's term (1977-1989). At present, Silalaeng is under the leadership of Khamnan Charoon Harnyuth who pledges to carry on the CBWM as that of his predecessors. Both Khamnan Muangdee Preedawong and Khamnan Thawaj Yangyun were awarded the prestigious Golden Badge Awards (*Naeb Thongkham*) from the Minister of Interior for their excellent performance during their services. Khamnan Muangdee was also appointed as a member of the National Legislative Assembly in 1973.

Silalaeng's leadership, unlike Ban Luang, used the formal organization (Tambon Council) and official leaders (Khamnan and Phuyaiban) as the mechanisms to manage the local watershed and has gained recognition from the government. This helps Silalaeng benefit from government funding for their monitoring tasks. High-

ranking officials, including the Prime Minister, have occasionally visited Silalaeng watershed forest. This helps Silalaeng gain publicity which in turn strengthens its legitimacy to manage the local watershed.

Leadership also played an important role in creating the rules governing the designated watershed forest of Thung Khao Hang. The former village headman initiated the protected watershed forest in close consultation with fellow villagers. The present village headman has carried on the institutional arrangement which is still in the developing period. In this case, strong leadership is essential for the continuity of operational rules which are not yet fully established when compared with those of Ban Pae and Silalaeng.

In the case of Ban Pae, leadership skill had a minor role when compared with other communities, because the myth of the spirit of the watershed forest and kinship network in the village have greatly influenced cooperation among members of the community. Besides, Ban Pae is a small village, and decisions can be made in the village meeting. Nonetheless, leadership skill is still necessary to coordinate the cooperative activities and keep the rules in effect.

At present, it is not uncommon for the local leaders, either Khamnan or village headman, to belong to the upper socio-economic stratum of the village. In some communities (e.g. Tambon Pi in Ban Luang), these leaders have entrenched their interests in logging and timber trading. This makes any initiative in forming CBWM impossible. The long enduring and well established CBWM institutions tend to exist where there are records of honest and charismatic leadership, like the case

of Silalaeng.

The leaders are supposed to be the representatives of the local community in dealing with state authorities and other external arrangements, or known as "synaptic leader" (Moerman, 1969; Keyes, 1970). However, when the village economy and polity become more dependent on external forces, the role of local leaders as representatives of the community is diminished since their interests depend on external resources. They become agents of the state, and in many cases, the capital owners within the community (Hart, 1989; Hirsch, 1990b). Local organizations such as the Tambon Council and Village Committee have become functionaries of the state and, in some cases, of the market as well. This is one reason why not every community is capable of forming CBWM institutions, and why some CBWMs have failed to keep their local institutions in effect.

Summary

All the socio-economic characteristics discussed above, constrained by the physical attributes of the watershed together configure the way the watersheds are managed. Communities with small numbers of users are likely to form effective community-based watershed management because recognition among the co-users makes it easier to detect the behavior of each other. Three types of agricultural land use - paddy fields, upland cropping, and orchards - influence land tenures, occupations, income, and types of conflict, which then indicate the dependency on the

watershed resources. These interrelated variables determine the need to cooperate in the use of the watersheds which results in the invention of rules to regulate the patterns of behavior of the resource users. Changes in the education level of the individual users differentiate occupations and income which eventually affects dependency on watershed resources. Dependency on watershed resources ultimately enhances evolution of community-based watershed management. The social organization of the *Muang Fai* system is the most important foundation for the development of CBWM. Leadership skills of the local leaders are the prime catalyst in institutional arrangements for CBWM. These variables determine the formation of community-based watershed management as depicted in Figure 6.1.

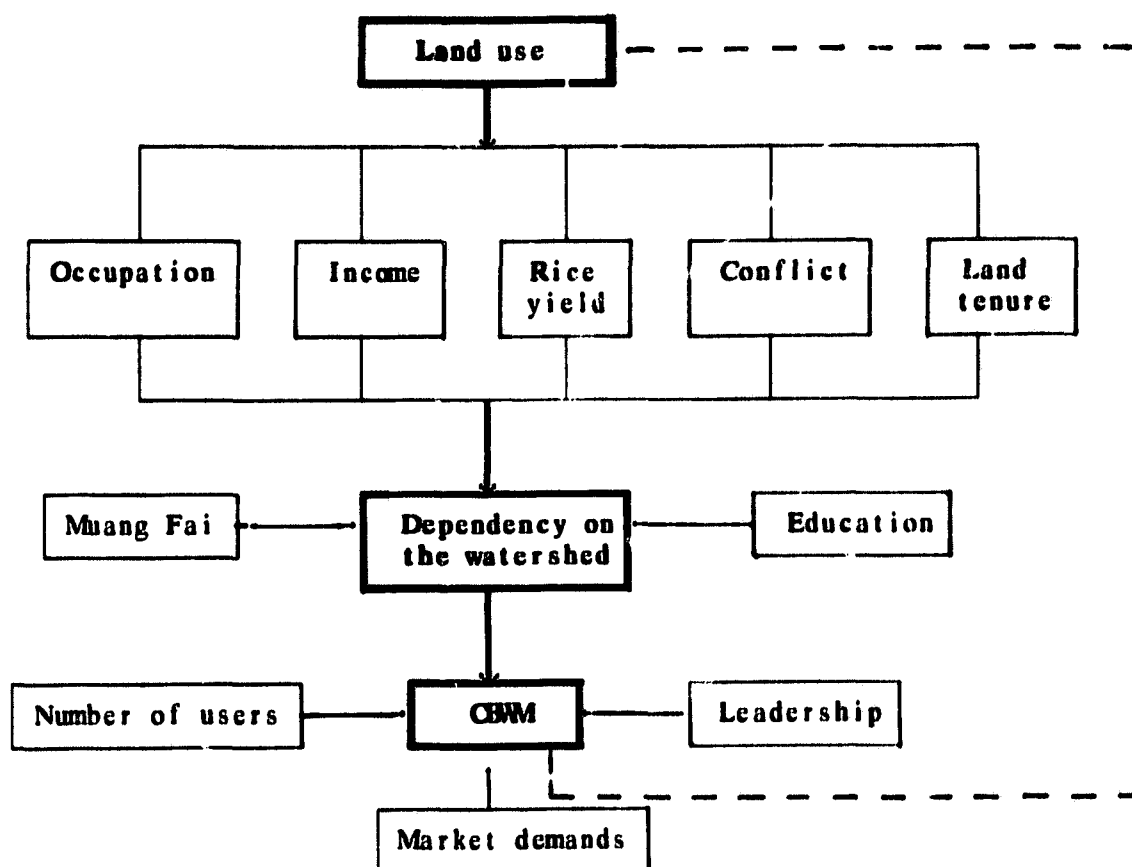


Figure 6.1 Socio-economic characteristics influencing the formation of community-based watershed management

Notes

1. See more details in Tan-Kim-Yong (1983) and Surarerks (1986).

2. An average rice field of 6 rai would yield enough rice for consumption in a household of 5.6 persons if the average yield were 40 *tang* per rai in the Chiang Mai-Lamphun basin (Ganjanapan, 1984). In the Province of Nan, Chapman (1978) similarly indicated that the average household of six persons with between 3.0 and 5.0 rai of wet-rice cultivation hardly yielded enough rice to meet the household's subsistence requirements. Given the average yield of 35 *tang* per rai in the lowland near the Na. river, a cultivated area of about 6.0 rai per household was needed to meet the subsistence level.

3. The NS.3 granted between 1954 and 1972 was mapped in isolation by tape survey, and the land was described in the certificate by metes and bounds, with an approximate diagram showing the shape of the plot. The NS.3K has been introduced after 1972 with systematic surveys using unrectified aerial photographs where land is described on the certificate by a deed plan, and certificate states that the holder "has possessed and made use of the land." The proposed transfer of NS.3 must be noticed for thirty days before the actual transfer because of distortions in the shape and area described in the certificate (Fieder *et al.* 1988).

4. The *Krongk um chadthidintamkin kae prachachon phuyakrii thi arsai yunai paasa-nguan* (The land allocation program for squatters who occupy national reserve forests), operated by the Army, was suspended after a bitter protest by the villagers who were evicted from their lands and relocated to the less arable areas without sufficient infrastructure.

Chapter 7

Decision-Making Arrangements

This chapter follows the framework of institutional analysis that categorizes institutional arrangements into three levels of rules as outlined in Section 2.6, in Chapter 2, and reconceptualized in the conceptual framework discussed in Subsection 4.1.3. The institutions as defined broadly in this study embrace all institutional and organizational entities involved in community-based watershed management. Although this study focuses on the local institutional arrangements, the fact that all rules are nested in another set of rules (Ostrom, 1990) leads to analysis of the linkages between these rules (Oakerson, 1986; 1992).

7.1 Operational Rules

Operational rules are devised by the local community to regulate the use of watershed resources held as commons in a specific community. These rules vary from one community to another depending on the physical constraints in the given watersheds discussed in Chapter 5 and the socio-economic characteristics of user communities discussed in Chapter 6. These rules may, or may not, coincide with national legislation and administrative regulations issued by the government, and in some cases, may even be sharply contradictory to the law (Ostrom, 1990).

In the case of Ban Luang, management of the watershed forest areas has been under the umbrella of "An Agreement on Watershed Forest Protection of Ban Luang" dated December 30th, 1975. This agreement was reached by the consensus of the farmer groups after the end of the blockade of the logging concession in the watershed forest. It provides general guidelines for watershed forest protection for the Tambon Council to apply with their villagers. It consists of the following principles:

1. Villagers who want to cut trees for house building have to ask for permission from the Tambon Council. After approval from the Tambon Council they have to request permission from the RFD official at the district office. Then they can go to the forest to cut the trees.
2. Every member of the community has the responsibility to help monitor for forest intrusion from outsiders and report the incident to the village headman or Khamnan immediately.
3. Hilltribes are not allowed to clear the forest for shifting cultivation in Ban Luang territory.
4. Any logging concession in the forest of Ban Luang has to seek approval from the Tambon Council.
5. The Tambon Council in turn has to get at least 80 percent of the members of community to agree with such a concession.
6. The villagers are not allowed to accept any kind of bribery from the logging company.

Source: Translation from original document held by Khamnan Pan Inlee, the former leader of the farmer group and former Khamnan of Tambon Suad.

The intention of this convention was initially to prevent logging concessions. As observed during fieldwork, cutting trees for building houses in many villages of

Ban Luang is not restricted except in the protected headwater areas such as Huey Sipan (see Figure 3.3) and areas close to the stream channels. This is partly because the villagers in Ban Luang believe that the watershed forests are plentiful enough for domestic use within their community. As long as they have already informed the village headman or Khamnan in advance they can arrange the date to go to cut the trees, in most cases, with help from fellow villagers as a form of reciprocity. In fact, the reason for compliance with the rules is to be secure in case of being arrested by officials, rather than aware of the virtue of the community rules *per se*. If they get caught by the forestry officers or the police for breaking the forest laws the village headman and fellow villagers will help negotiate with the officials to release those held. In most cases, local officials usually compromise with the villagers to avoid a mass confrontation. Local forestry officials sometimes complain about the behavior of the villagers for ignoring the forest laws and creating rules for their own interests (anonymous forestry officer, 1992, personal communication). Meanwhile the villagers lose faith in the performance of the officials and consider it necessary to manage the watershed forest by community rules.

Many officials are also sceptical about effective enforcement of the community rules because it turns out that there are approximately one hundred chain saws used in commercial logging in the possession of Ban Luang people. Chain saws were illegal. However, during the field work for this study the government deregulated the law allowing owners of chain saws to register their possession with the district officer and pay license fees.

The operational rules of the watershed forest in Ban Luang are intended to prevent the appropriation of watershed forests by outsiders, while the people of Ban Luang enjoy the rights to these resources. This can be seen from the radical measures against hilltribes and other outsiders. The requirement for peoples' approval in logging concession results from previous experience, when the government granted a concession in the headwaters. However, in terms of the present property regime, this requirement has no legal basis. The state has the rights and jurisdiction over the watershed forests. The villagers have a duty to comply with the government regulations, or otherwise revolt against the state, as they did last time.

Silalaeng, as a single Tambon, has well-established rules and an organized body for management of the community watershed forest. Rules governing use of the forest have evolved since inception. The rules have been written and can be translated from the original Thai manuscript as follow:

**Regulation of Silalaeng Tambon Council
Concerning Protection of the Forest
B.E. 2532 (1989)**

Tambon Silalaeng is situated adjacent to the watershed forests. The majority of the community members live on agriculture which relies on water for their wet-rice fields, upland cultivation, and orchards so that water resource maintenance is the most important factor for their livelihood. The Tambon Council has realized that the flow of water is dependent upon the healthy forest at the headwaters. The Tambon Council has for a long time campaigned to preserve the remaining forest, yet some aspects need to be improved continuously.

To acquire the highest level in forest protection, the Tambon Council therefore promulgates these regulations concerning forest protection. These regulations, including the rules, agreements, and mechanisms of forest protection, will be used as the guidelines for the Tambon Council in managing the community forest:

1. This regulation is called "The Regulation of Silalaeng Tambon Council Concerning Protection of the Forest"
2. This regulation is in effect since the date of promulgation.
3. The members of the Tambon Council have a duty to maintain this regulation for the common interest of Tambon Silalaeng and the neighbouring community.
4. The Tambon Council as an administrative committee is responsible for forest protection.
5. Each village headman has to submit 3 persons from his village to be the monitors in the "Forest Patrol Committee" and is responsible for any change in these representatives.
6. The Forest Patrol Committee is on duty twice a month or more.
7. The Forest Patrol Committee operates 2 routes: Route 1 - Khun Huey Han, Huey Toi, and Huey Hin Lab - is under the responsibility of Ban Hia, Ban Don Chai, Ban Sala, and Ban Fai with Phuyai Serm Takhaeo as a team leader; Route 2 - Nam Khun, Huey Pah Chan, Huey Phee Ba - is under the responsibility of Ban Hua Nam, Ban Teen Tok, Ban Hua Doi, Ban Nam Peon, Ban Huey Sanao, Ban Paa Klang with Khamnan Thawaj Yangyun as a team leader.
8. Forest patrols are formally assigned by the Tambon Council. Everyone in the committee has to sign up his name at the meeting at the Khamnan's home before leaving.
9. The Forest Patrol Committee are under the protection of the Tambon Council while on duty.
10. In the case of loss of life while on duty, the Tambon Council will compensate the family with the amount of 10,000 baht. In the Tambon Council meeting session 11/2532, the amount of money was changed to "1,000 baht from each village."

11. In the case of injury while on duty, the Tambon Council will consider compensation based on the individual case.
12. Should any village not cooperate and not comply with this regulation (concerning forest patrol), the possible penalties are as follows:
 - warning and more contributions next time
 - fine for 100 baht/person/day
 - forfeit the rights to use the forest
13. The Chairman of the Tambon Council (Khamnan) has the duty to coordinate with other Tambon, with the Forest Patrol Committee, and with the government officials involved in forest protection.
14. Every member of the community has the right to request for appropriation of the forests for building a house. The villagers may make a request through the village headman who will bring it up for approval at the meeting of the Tambon Council.
15. Requests for appropriation of the forests for house building is limited to only 3 logs for one village a month.
16. Penalties for violating the regulation of forest appropriation are as follows:
 - be fined 1,500 baht for each tree cut
 - if fail to comply with the above fine, the Tambon Council will take legal action (illegal logging)
17. Villagers who give information about the violation of rules which leads to a seizure of logs will be awarded half of the value of the confiscated property.
18. Villagers allowed to cut trees must replant 5 trees for every one tree cut.
19. Villagers who want to collect fuelwood and make charcoal have to seek approval from the Tambon Council.
20. One third of the revenue from the fines goes to the Tambon Council for public spending and the rest is awarded to the Forest Patrol Committee.

21. This regulation may be amended to keep up with the changing situation. The amendment has to be approved by two-thirds of the members of the Tambon Council attending the meeting.

Date 6 April B.E. 2532

**Signature.....
(Thawaj Yangyun)**

**Chairman of Silalaeng Tambon Council,
Pua District, Province of Nan.**

The operational rules of CBWM in Silalaeng have become institutionalized into the routine activities in the community. The regularity of rule enforcement and leadership skills have contributed to the establishment of this local institution. The operational rules of Silalaeng, when compared with those of Ban Luang, clearly state the rights and duties of the members of the community as well as the authority and liability of the Tambon Council as the decision-making body. The penalty for rule violation is also stated in the regulation. The rules appear to be tougher for the appropriation of watershed resources. The monitoring of user behavior is through the "Forest Patrol Committee" similar to the patrol detectives in the common land of Japan (McKean, 1992).

Thung Khao Hang, like many rural communities in the North, has created "village laws" to maintain peace and order within the community. This kind of law, locally known as *Kodmai Muban* (similar to *Kodmai Paa* in Hirsch, 1990b), has helped settle a variety of minor conflicts at the village level. The coverage of village laws includes internal affairs of the household, firearm violation, vandalism, theft,

dispute, nuisance, free riding. There are two articles in the village law of Thung Khao Hang that govern the management of protected watershed forests:

"Article 12. Ones who cut the trees or make the charcoal for commercialization will be fined an amount not exceeding 1,000 baht and sent to the official to take legal action.

Article 15. All kinds of trees in the protected watershed forest are preserved. Ones who violate this protection will be sent to the official to take legal action."

The village law of Thung Khao Hang is written on a big board and posted at the *Sala* (public shelter) or village hall where everyone can see it. In fact, the village law is common knowledge, based on the consensus of members of the community. In remote areas outside the reach of the national law, village laws have been effective mechanisms in social control for a long time. Local villagers are used to this kind of law and the village laws become the norms or folklore of the community. In a self-contained village community like Thung Khao Hang, social sanctions are effective punishment because the villagers are aware of maintaining dyadic relationships between each other.

In the case of Ban Pae, the operational rules for the watershed forest are based on the tradition that has continued for generations. These rules have become common knowledge and constitute common laws. Every household knows the rules and traditional practices concerning the watershed forest, despite no written documentation. Information obtained from the interviews enabled the investigator to compile the operational rules of Ban Pae's CBWM as the following:

- 1. Watershed forest is protected entirely to sustain water yields. Any kind of tree cutting is strictly prohibited.**

- 2. Ones who violate the rules (cutting the trees) will be fined at the rate of 100 baht for every inch of the length of the confiscated wood.**
- 3. If the violators do not comply with the fine penalty, they will be sent to the police.**
- 4. All villagers are responsible for monitoring any kind of wrong doing in the watershed forest. Anyone who gives information which leads to the arrest of the violators will be rewarded 200 baht per case.**
- 5. Revenue from the fines and fuelwood auctions are kept by the chairman of the village committee for public spending in the village. Spending must be approved by the village committee.**
- 6. The village committee is the organization responsible for rule enforcement and making decision.**
- 7. Each member of the village committee is responsible for coordination of 10 households to provide a two-man shift for foot patrol at night.**
- 8. Extraction of fuelwood from the watershed forest is allowed by auction only.**

Relationships among the villagers of Ban Pae are interwoven by a kinship network because Ban Pae has expanded its community from the same families since the beginning of settlement. Norms and traditions are important mechanisms in social control including the control of pattern of use of the local watershed forest. It is also found in many communities in the North of Thailand that sacred groves have been maintained in association with a belief in a watershed spirit for centuries (Ganjanapan, 1992).

Analysis of the operational rules in the different communities reflects the constraints of the physical and technical attributes of watershed resources as well as the influence of socio-economic characteristics of the user community as discussed

in the previous chapter. For example, cutting trees for house building is almost open to the members of the community in Ban Luang whereas it is limited by quotas in Silalaeng due to the scarcity of the mature forests. Meanwhile Thung Khao Hang and Ban Pae have imposed strict prohibition in tree cutting in the protected watershed forests.

To make the operational rules be effective, each community needs some kind of organizational arrangements to administer and enforce the rules, including the people involved in the process of decision-making. This is the topic to be discussed next.

7.1.1 Organizational Arrangements and Decision Makers

Decision makers are defined here as persons who are involved in rule making, rule enforcement, and making any decision on behalf of the members of the community concerning CBWM. The process of decision making and the number of decision makers may be different from one community to another depending upon the operational rules.

In the case of Ban Luang, the highest body of decision making is the so called Convention of *Khamnan* and *Phuyaiban* which administers the overall watershed forest of Ban Luang. This means the gathering of 25 members of *Khamnan* and *Phuyaiban* from different Tambon and villages in Ban Luang. In practice, this is rarely the case because each Tambon is delegated to handle its watershed area

within the general guidelines mentioned previously. Each Tambon tends to be independent from the others in making decisions on its watershed territory. It happens commonly that one Tambon accuses its neighbouring Tambon of insincerity and less active enforcement of the rules. Tambon Pi is usually blamed for not cooperating whereas Tambon Fah has imposed more strict measures in monitoring the watershed forest by setting up a check point to prevent the smuggling of timber from their community watershed forest. The Tambon Council has appointed a group of monitors to operate this check point especially at night time. It is reported that the leaders in Tambon Pi are involved in timber trading. In fact, Tambon Pi reluctantly joined the CBWM of Ban Luang after it was initially formed by Tambon Suad and Tambon Paa Kha Luang.

The double standards of rule enforcement may precipitate the breakdown of the whole system of Ban Luang's CBWM. This situation is similar to that suggested by Shui Yan Tang (1991) that problems arise where a uniform set of rules is applied to a large common-pool resource regardless of its specific circumstances. In this case, multiple layers of organizations may be needed to manage a watershed of such a considerable size (158,536 rai). In fact, organizational arrangements in Ban Luang originally functioned through the network of the water user groups rather than effectiveness of the operational rules themselves. The water user groups were arranged across the administrative boundaries (Tambon and villages) by using the watershed boundaries. The institutional arrangements of the water user group (*Muang Fai*) were well developed before CBWM was initiated.

Silalaeng has used the Tambon Council as the decision-making body in local watershed management. The Tambon Council is comprised of the *Khamnan* as Chairman, every village headman (*Phuyaiban*) in Tambon Silalaeng, a highly-respected elder (*Phusongkhunnawuthi*) elected (for 5-year term) from each village, Tambon doctor (*Paet Pracham Tambon*), the secretary selected from elementary school teachers, and an adviser appointed by the district officer (*Nai Amphoe*) from either the deputy district officer (*Palad Amphoe*) or community development officer (*Pattanakorn*). The Khamnan, village headman, and Tambon doctor are *ex officio* members. The Tambon Council is the only authority in making decisions on every activity of CBWM in Silalaeng. This makes for strong unity in the decision making process and fits CBWM into the regular activities of the Tambon Council. Its mandatory duties and liability are clearly specified in the regulations discussed earlier. There was a minor problems in rule enforcement in initial operation as some villagers are reluctant to voluntarily join the forest patrol committee because they are teased by their fellow villagers as being forestry officials. This problem was resolved by rotation of forest patrol committee duty among the villagers. The monitoring committee in Silalaeng is well organized with a clear mandate and continual activities. The monitors get paid for each day that covers their lunches on patrol and insurance in case of loss of life or injury.

Thung Khao Hang and Ban Pae use the Village Committee (*Kana Kammakarn Muban* or *Kor Mor*) as the decision-making body. Thung Khao Hang community is organized in a form of the Volunteer Development and Self-Defence

Village (known in Thai as *Muban Arsa Puttana Lae Pong Kan Ton E'ig*, or *Muban Or Por Poh*). The village is divided into 12 groups. Each group consists of 12-13 households. Each selects a leader for representation in the Village Committee comprised of the village headman as chairman, the committee in charge of administration, security, development, welfare, education, public health, finance, the secretary, and a well-respected elder. This organization helps strengthen the unity of the village and network of communication. Enforcement of village laws has been undertaken effectively through this organization. Protection of the designated watershed forest is included in the responsibility of the Village Committee with the authority specified in the village laws.

Ban Pae, like other rural villages in general, has a Village Committee (*Kor Mor*) to assist and advise the village headman in overseeing village affairs. In general form, the Village Committee consists of the village headman as chairman, the deputies of the village headman, a number of 5-9 highly-respected elders (*Phusongkhunnawuthi*) elected for a term of 5 years. A deputy chairman, secretary, and deputy secretary are selected from those highly-respected elders. In addition, at least 7 sections responsible for specific affairs are set up to assist the Village Committee, similar to those in Thung Khao Hang. Each member of the Committee is responsible for coordination of the group of 10 households.

All communities tend to use organizations that already exist in the local community to be the decision making bodies for CBWM instead of creating new organizations. Although most CBWM institutions were initiated by a water user

group, their activities have later been shifted to the local administrations such as the Tambon Council and Village Committee. The exception is the case of Ban Luang that created the "Convention of *Khamnan* and *Phuyaiban*" to oversee the general guidelines of watershed management, yet in practice, it still relies mostly on the Tambon Council and Village Committee. The reason that they make use of the existing local administration to undertake the CBWMs is because they will be able to gain recognition from the government and may benefit from government rural development programs such as the Tambon Council development budget. Besides, in Thai bureaucratic polity, an organization that is distant from the state apparatus tends to be viewed with suspicion (*Peng Leng*) by the government officials as a threat to national security. Furthermore, it may not be productive to add another body of decision making into a small community which is already full of committees filled with the same group of people.

7.1.2 Analysis of Operational Rules at the Household Level

Analysis at the individual level investigated the perception of the villagers concerning common property resource management of watershed resources at the local level. Overall, 72.9 percent of the respondents consider their community watershed as a common property resource which the members of the community share with equal rights and duties; 25.5 percent recognize the watershed forest as a state property resource where the state has the entire rights and duties; only 1.6

percent consider the watershed forest as an open access. This different perception of property regimes of the watershed is significantly associated with different communities ($\chi^2 = 33.42$, $P < 0.001$). Ban Pae has the highest percentage of perception of a common property regime (Table 7.1). This can be concluded that the villagers in a small community with small watershed area in close proximity are likely to develop collective actions with each other as well as with the local resources, as stated previously by Ostrom (1992) and Feeny (1992).

Table 7.1 Perceptions about property regimes of watershed forest at local level

Perception	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
common property	55.7	79.1	77.3	93.8	72.9
state property	39.6	20.9	22.7	6.2	25.5
open access	4.7	-	-	-	1.6
Total	100.0	100.0	100.0	100.0	100.0

It was also found that among the villagers who recognize the watershed as a state property resource many of them claim that they deserve a right to manage the local resources for the security of their livelihood. Many local people are confused about the use rights and ownership of the watershed forest. In fact, many villagers realize that the watershed forest ultimately belongs to the state and do not care about ownership or property regime. What the local people care about is rather the rights to use and manage the local watershed forest that their livelihoods depend on. This might be a good sign for power sharing between the state and the villages in

watershed management in the form of a co-management strategy where the state maintains the ownership of the watershed forest and the villages are granted the rights to manage the resources for their own interests.

Knowledge about the existence of operational rules governing the use of the watershed forest is important to cooperation in CBWM. Almost all respondents know about the rules and penalties in effect (Table 7.2). Nonetheless, there are some differences in knowledge about the rules. During interviews it became apparent that some people were ignorant about details concerning duties, penalties, and the decision-making process.

Table 7.2 Knowledge of operational rules and penalties among members of the communities

Knowledge of rules	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
don't know	3.8	1.2	1.5	-	2.0
know	96.2	98.8	98.5	100.0	98.0
Total	100.0	100.0	100.0	100.0	100.0

A few households in remote areas of Ban Luang knew only that the rules existed but did not know the detail and mechanism of the rules. They perceived the operational rules of the watershed forest as an exogenous governance rather than endogenous norms of the village. This perception results in indifferent response to the rules, and the tendency to behave opportunistically. However, these people were exceptional cases found only in a large area like Ban Luang where the decision-

making process could not involve all members of the community.

In Silalaeng, the operational rules of CBWM are perceived as the norms and values in daily life of the community. These rules are an intrinsic way of life of the local people. When equipped with a punitive system, these rules are more effective than those of Ban Luang which are prone to be used arbitrarily by the decision makers in different Tambon.

In small communities like Thung Khao Hang and Ban Pae, the operational rules are common knowledge and everyone is aware of their function. In Thung Khao Hang, the operational rules of CBWM are perceived by the villagers in the same way as the village laws used in solving other offenses. The operational rules of Ban Pae's CBWM have also been reinforced by belief and myth of the spirit of the headwaters.

Knowing about the existence of the operational rules may not mean that all the villagers acknowledge and accept the rules voluntarily, although most of them do. From the survey, it was found that overall an average of 88 percent accept the rules voluntarily while the rest reluctantly accept the rules because they have to comply with the majority (Table 7.3).

Table 7.3 Percentage of respondents accepting the rules in each community

Acceptance	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
reluctantly	17.0	11.6	9.1	4.2	11.8
voluntarily	83.0	88.4	90.9	95.8	88.2
Total	100.0	100.0	100.0	100.0	100.0

Some groups of people whose livelihoods are adversely affected by the rules of CBWM are certainly not pleased with them. These are mainly the landless farmers whose livelihoods depend largely upon the forest lands. This group of people are usually at the lower stratum of the village society and their voices are often ignored and outnumbered by the rice farmers or the water users.

Another group is the people who have vested interests in trading forest products, such as timber. This group is small in number but usually powerful. To convince these people to comply with the rules is critical for the success of CBWM. They will consent to being deprived of certain resources of the watershed only if they can be convinced that what they do not appropriate from the watershed is really needed for its long-term sustenance, and that other fellow villagers will exercise similar restraint.

This can be seen in the case of Silalaeng where in the past many households had practised shifting cultivation and a few had engaged in logging and timber trading. The Tambon Council has campaigned ruthlessly to persuade the villagers, especially in the three hilltribe villages, to stop shifting cultivation and give up any illegal business in the forest. There is now no shifting cultivation in Silalaeng's watershed area and the timber traders have turned to legitimate business such as the supply of construction materials as mentioned in Chapter 6. However, this kind of adjustment also depends on available alternatives for livelihood changes in the community such as off-farm employment and job opportunities outside the community.

Participation of the community members in decision-making procedure varies significantly among different communities ($\chi^2 = 50.47$, $P < 0.001$, Table 7.4). This is related to the number of the users in the community. In a large community like Ban Luang the decision-making procedures, particularly rule making, rule amendment, and penalty setting are the responsibility of the group of leaders and decision makers. Most of the community members do not directly take part in these procedures. The survey found that only 25.5 percent of the respondents in Ban Luang had participated in decision making procedures (Table 7.4). Therefore some decision making may not represent the consensus of the members of the community. Some members of the fringe villages might not be well informed about details of the rules applying to them, which in turn makes them less enthusiastic about CBWM.

Table 7.4 Percentage of households taking part in the decision-making process

Participation	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	74.5	72.1	36.4	27.1	58.2
yes	25.5	27.9	63.6	72.9	41.8
Total	100.0	100.0	100.0	100.0	100.0

Silalaeng is similar to Ban Luang in terms of the low percentage of the respondents (27.9 %) with direct participation in decision-making procedures because of the large number of users. Rule making tasks are left to the Tambon Council. However, the villagers in Silalaeng seem to have more opportunities to express their opinion indirectly before and after the final decisions are made by the Tambon

Council. The village headman from each village is the coordinator between his villagers and the Tambon Council to bring up the issues from his village in the meetings of the Tambon Council and in turn conveys the Tambon Council resolutions to the villagers in the village meeting. In addition, the villagers have the opportunity to participate in the Forest Patrol Committees which are rotated among the members of the community every year.

Thung Khao Hang and Ban Pae allow more opportunities for the members of the community to participate directly in the decision-making processes because of the small number of users. Important issues about the watershed forest are usually brought up in the village meetings to let the villagers express their opinion. Not surprisingly, the percentages of households having participated in rule making are higher than those of Ban Luang and Silalaeng (Table 7.4).

The congruence of operational rules with the physical attributes of watershed resources as well as socio-economic conditions of the local community is also important to keep the rules enforceable. Over 90 percent of respondents overall agree that the present operational rules are congruent with the local conditions (Table 7.5). Ban Luang has a slightly higher percentage disagreeing about the congruence of the rules. The fact is, however, that it is not a matter of the congruence of the rules in effect but rather the effective enforcement of the rules. It was found during the interview that many villagers have called for strict enforcement of the rules and some have called for the escalation of penalties. Silalaeng and Ban Pae have adjusted the rules periodically to keep up with the

diminishing watershed forests and the changing socio-economic conditions of the communities. Thung Khao Hang also closed its protected watershed forest for the appropriation of bamboo when the rate of cutting tended to exceed the rate of replenishment.

Table 7.5 Percentage of respondents agreeing that there is congruency between the operational rules and the local conditions, by community

Congruent rules	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	15.1	7.0	4.5	6.2	9.2
yes	84.9	93.0	95.5	93.8	90.8
Total	100.0	100.0	100.0	100.0	100.0

7.1.3 Institutional Performance of Community-Based Watershed Management in the Four Communities

The performance of the CBWM system under the governance of local institutions can be examined by using Ostrom's (1990) design principle as the agenda, as discussed in Chapter 2. The eighth principle (nested enterprises) is not relevant in any CBWM in this study. The following is an assessment of institutional performance of CBWM in the four communities categorized by each design principle.

(1) *Clearly defined boundaries*. Clearly defined boundaries here refer to two elements: the boundaries of the watershed areas; and the clearly defined membership of the individuals or households who have the rights to withdraw resource units from

the watershed. The presence of clearly-defined boundaries makes the "common-property" regime different from the "open-access" regime.

In the case of Ban Luang, the local people use the topographic divide as the boundaries of the watershed. These boundaries are seemingly clear enough in the minds of local people. However, due to the large area of the watershed, it may not be clear to outsiders who are not familiar with the area. Some parts of the watershed overlap with the Doi Pha Chang Wildlife Sanctuary such as the northern area of Tambon Pi (see Figure 3.3). In terms of the clearly defined membership, in principle, all households of Ban Luang are eligible users of watershed resources. In practice, a large number of users may create confusion in distinguishing between eligible users and outsiders. Furthermore, it is not clear whether government officials moving to Ban Luang to perform their duty are eligible to gain access to the watershed resources or not.

Silalaeng, when considered from the physical attributes of the watershed, may not have much advantage in delineation of watershed boundaries. However, the operational rules and the monitoring activities have helped make the watershed boundaries clear to the local people. An agreement with the H'tin of Tambon Phuka and with the park officials about the boundaries of the watershed forest has established well-defined boundaries, as shown in Figure 3.4. In addition, the Tambon Council has put up concrete poles to mark the border of the watershed areas. For membership, the users of the watershed resources are all the households in Tambon Silalaeng. Regular coordination between the village headman and the Tambon

Council and the rotation of the forest patrol committee have kept most of the users close together with a variety of reciprocal activities.

The boundaries of the designated watershed protection area of Thung Khao Hang are roughly delineated by the small watershed boundaries that shed the water to its stream channels (Figure 3.5). These boundaries are clear for the villagers of Thung Khao Hang. For the outsiders, however, it may be difficult to tell the exact boundaries because this designated watershed area is in the middle of a vast forest area surrounding the village. The users of the watershed forest are clearly defined as being residents of the village.

The boundaries of the watershed forest of Ban Pae are visibly clear. With the small size of the forest area, it is technically feasible to fence along the boundaries, if necessary. The membership of the users is also clearly restricted to the villagers of Ban Pae only.

(2) Congruence between appropriation and provision rules and local conditions.

In most communities, it seems that the operational rules are congruent with the conditions of the localities as discussed previously in this section, and mentioned in Chapter 5 and 6. The appropriation rules reflect the degree of scarcity of watershed resources and the priority needs of the communities. Ban Luang does not pose strict limitations on appropriation of forest use for household subsistence because its forest condition is still healthy. Silalaeng controls the rate of appropriation by the quota of trees that can be cut per month for each village and allows only fallen trees to be taken for fuelwood. In Thung Khao Hang, the designated watershed forest is closed

to appropriation to allow replenishment. Ban Pae prohibits the appropriation of timber completely. All in all, the four communities are similar in preserving the watershed forest for the source of water used in paddy farming.

(3) *Collective-choice arrangements.* This principle enables individuals affected by the operational rules to participate in modifying those rules. According to Oakerson (1992), this principle is the individuals' rights to say "no". In the case of Ban Luang and Silalaeng, the individual users do not directly participate in modifying the rules because this procedure rests with the Tambon Council. In practice, they can still participate indirectly through the village meeting. Besides, most of the members of the Tambon Council are representatives of the villagers. For the smaller communities, like Thung Khao Hang and Ban Pae, individuals are able to participate in modifying the rules directly at the village meeting.

(4) *Monitoring.* In principle, all members of the community are responsible for monitoring the watershed and monitoring other members' behavior. It is stated as such in the operational rules of all the communities studied. In practice, only Silalaeng is operating monitoring tasks on a regular basis as discussed earlier in 7.1.2. Ban Pae used to operate a two-man patrol in the watershed forest at night but this is now discontinued. Ban Luang occasionally launches surveillance when informed about commercial logging. Thung Khao Hang does not have any formal monitoring activity. In the local community, the villagers usually go to the forest in their daily life to collect some minor forest products or look after their cattle, which in turn enables them to monitor the watershed at the same time.

(5) *Graduated sanctions.* Social sanctions for persons who violate the operational rules may range from lenient sanctions to strong punishment, depending on the context and seriousness of the offence. Since it is graduated to fit the offence, the scale of punishments is very important in controlling repeat offenders, as described by McKean (1992) that the desperate offenders know that they might be forgiven once, but the malicious offenders know that they would suffer severely for their repeated offences. In CBWM, sanctions may include warnings, fines, suspending rights to appropriate resources, and prosecution. Graduated sanctions are applied in all the four communities. However, the details of penalty may vary from one community to another, as discussed earlier in this section. In the early period of watershed protection, graduated sanctions were used within the user community. First-time offenders might be warned or fined. However, sanctions have recently changed from leniency to strong penalties to keep up with temptation in breaking the rules. Many users have called for prosecution of the violators by external authorities.

(6) *Conflict-resolution mechanisms.* In general, it is a tradition that the leaders and decision makers in the local community are also the juries who resolve disputes in their village. The local leaders have undertaken this traditional role since the early settlement because at that time the state authority hardly reached these remote areas. As the resources have become scarce, however, the number of conflicts has increased. This resulted in the development of local institutions for CBWM. In most cases, the conflicts were still resolved at the community arena. In cases where they cannot be settled by the local decision makers, external arrangements may be sought

to resolve the disputes. External arrangements can be mediation by government officials as the third party, or legal action, if applicable. These kinds of conflict resolution are available in all the four communities as mentioned earlier.

(7) *Minimal intervention in rights to organize.* This design principle means that the rights of the resource users to devise their own institutions are not challenged by external governmental authorities (Ostrom, 1990). So far, the CBWM initiatives in the four communities being studied have not been over-ridden by the state. On the contrary, national policies seem to support the role of the local institutions in protecting the local watersheds. Although there is no change yet in the state-property regime over the watershed forest, the government agencies, in practice, choose to refrain from asserting their rights to manage the watersheds in which local institutions have already been established. A Community Forest Act has been proposed in the legislature which may legalize the rights of the communities in managing local resources.

Apart from the seven design principles discussed above, the current performance of local institutions was also assessed from the perspective of the villagers about potential threats to the sustainability of their local institutions in the future. Overall, 17 percent of the respondents think that there are no potential threats to the sustenance of their CBWM system (Table 7.6). However, 41.8 percent are somewhat concerned about the increasing incidents of rule violation, 15.7 percent are concerned about the pressure from the outside community, 13.1 percent are worried about government intervention, and 11.1 percent think that weak leadership

may undermine the local institutions. The potential threats are significantly associated with the different communities ($\chi^2 = 83.96$, $P < 0.001$).

Table 7.6 Perceived potential threats to the institutional sustainability of the CBWM system in each community

Potential threats	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
none	7.5	20.9	7.6	43.7	17.0
rule violation	43.4	46.5	54.4	12.5	41.8
outsiders	28.3	8.1	12.1	6.2	15.7
authority	9.5	14.0	6.2	29.2	13.1
leadership	10.4	9.3	19.7	4.2	11.1
others	.9	1.2	-	4.2	1.3
Total	100.0	100.0	100.0	100.0	100.0

In Ban Luang, Silalaeng, and Thung Khao Hang, the majority of respondents consider the increasing incidents of rule violation by members of the community as the most serious potential threat to institutional stability. This opinion needs some attention because the sustenance of the CBWM is basically founded on cooperation among the users. A number of people in Ban Luang still feel threatened by pressure from the outside demands on their watershed resources. In Silalaeng, 14 percent of respondents are not so sure about the government policies in the future regarding the national park area. Thung Khao Hang considers leadership failure as the second most serious potential threat to the sustenance of the local institutions. The majority of Ban Pae's villagers foresee no potential threat to their CBWM under current

circumstances. Nonetheless, there are some concerns (29 %) about the role of the RFD because the officials have deliberately made use of Ban Pae's success for their own programs.

When asked for recommendations about improving the current situation of their CBWM system, overall almost 57 percent of respondents have no recommendation about what should be done with the existing system (Table 7.7). This is partly because they are really satisfied with the performance of their local institutions (see Section 8.2). Nevertheless, some points of view expressed during interviews were: the need for consensual cooperation from all members of the community, substantial support and action from the government, and strong punishment respectively.

Some recommendations reflect changes in collective action in the current situation. They call for more cooperative activities because traditional reciprocity is eroding and free riding appears to be increasing. The needs for substantial support from the government and stronger punishment are a response to anticipation that problems may be beyond the ability of the local institutions. Besides, monitoring by regular patrols and surveillance is too costly for the local communities to bear on their own. Although the majority of these communities are confident in the ability of the local institutions to manage their local watershed forests, they still want the external arrangements to be ready to take action as a third party in the case of serious disputes.

Table 7.7 Recommendations on performance of local institutions of CBWM in each community

Recommendations	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
none	50.9	44.2	72.7	70.8	56.9
more cooperation	17.0	23.2	16.7	14.6	18.6
government support	22.6	22.1	7.6	14.6	18.0
strong punishment	8.5	10.5	3.0	-	6.5
Total	100.0	100.0	100.0	100.0	100.0

In summary, seven categories of design principles combined with the perspectives of the villagers on the current performance of their local institutions were used to assess the institutional performance of CBWM of the four communities being studied. An overall assessment is summarized in a matrix form (Table 7.8).

Silalaeng and Ban Pae are given the status of "robust" institutions because they meet all the design principles and the community members are confident about their CBWM system. Ban Luang is assessed as a "fragile" institution because its institutional performance lacks strength in enforcement and unity. Furthermore, its large area and number of users create some confusion, especially about the boundaries and membership. Thung Khao Hang is also given a "fragile" institution for the reason that its watershed boundaries are not clearly delineated which makes it difficult to distinguish the designated watershed protection area from the forest areas surrounding, notwithstanding the membership of the users is clearly defined. Moreover, the recognition of rights to organize the CBWM is limited to the local

administration which may make it vulnerable to invasion from outsiders.

Table 7.8 Summary of the institutional performance of community-based watershed management of the four communities

Design principles & Overall assessment	Ban Luang	Sila- laeng	Thung Khao Hang	Ban Pae
1.clearly-defined boundaries	no	yes	no	yes
2.congruent rules	no	yes	yes	yes
3.collective- choice arenas	yes	yes	yes	yes
4.monitoring	no	yes	no	yes
5.graduated sanctions	yes	yes	yes	yes
6.conflict- resolution mechanisms	yes	yes	yes	yes
7.recognition of rights to organize	strong	strong	weak	strong
Institutional performance	fragile	robust	fragile	robust

A robust institutional performance assessed today does not guarantee the sustenance of the local institutions forever. Rather it reflects the past performances that created the strength for today. The continuity of local institutions largely relies on resilience in the changing community. Fragile institutions can become robust in the future if they strengthen the present weaknesses; at the same time, robust institutions may erode quickly if the users discard their obligation to reciprocity.

7.2 Collective-Choice Rules

These rules are used by officials or external authorities in making policies about how the watersheds should be managed, and by whom. Analysis at this level involves the processes of policy-making, adjudication, planning, and program implementation concerning the watersheds. This section will discuss briefly the policy framework for watershed management in Northern Thailand, and then examine its effects on CBWM in the four communities.

7.2.1 Policy Framework in Watershed Management

Watershed management in Northern Thailand is complicated by remoteness, the ethnic and cultural diversity of the watershed occupants, poverty, and political sensitivity (Arbhabhhirama *et al.*, 1988). In the past three decades, these related problems¹ have been magnified. The headwaters of the four main tributaries (i.e., Ping, Wang, Yom, and Nan) in which the Chao Phraya river originates (Figure 3.1), are inhabited by more than 500,000 tribal people practising shifting cultivation (Omakupt, 1989). Moreover, the increasing migration by ethnic Thai from the densely-populated lowlands to the uplands and highlands to seek cultivated lands has added to the complicated problems of these critical areas (Tan-Kim-Yong *et al.*, 1988). Opium production and the cross-border movement of ethnic minorities have raised concerns over national security as well as international relations. These issues,

both real and perceived, have preoccupied policy formulation and development planning in these watershed areas for a long time. Following are the key policies and development plans concerning watershed management in Northern Thailand.

(1) National Economic and Social Development Plan

In terms of policy articulation, the first explicit policy statement concerning forested areas appeared in the First National Economic Development Plan (1961-1966). It aimed to preserve 250,000 square kilometres of forest land² in Thailand (approximately 50 percent of the country's total area). This target was later adjusted to 200,000 square kilometres or 40 percent of the total land area. Of this figure about 100,000 square kilometres (20 percent of the country's area) was designated to be watershed protection forest. The remainder was classified as productive or economic forest. This policy was carried on through the Third National Economic and Social Development Plan (1972-1976).

During the period of the First to the Third National Economic and Social Development Plans (NESDP) efforts to distinguish forest from agricultural lands were carried out through land classification including soil surveys and land capability studies. The purpose was to make use of the available land resource to enhance economic growth. The consequences of this policy resulted in the rapid expansion of cultivated land and the reduction of forest lands (Feeny, 1988b).

In the Fourth NESDP (1977-1981), due to the large area of forest land already

encroached upon, expansion of agricultural land was planned to be limited to less than 500,000 rai per year. Land reform, agricultural land development as well as forest conservation, and watershed rehabilitation were set as high priority tasks.

In the Fifth NESDP (1982-1986), apart from the continuation of land reform, forest village programs, allocation of land tenure, and forest conservation, a land-use survey for formulating a National Land Use Policy was also accelerated. The Sixth NESDP (1987-1991) promoted efficiency in land utilization by means of land use planning and land development, improving land-use information systems, watershed classification, and accelerating land titlement.

The current Seventh NESDP (1992-1996) emphasizes cooperation and participation of the public, private sector, non-governmental organizations as well as government agencies in the management and conservation of natural resources at both national and local levels. During this plan, the goal for protected forest area is likely to be changed to 25 percent of the country area, instead of the 15 percent in the 1985 National Forest Policy (Tangtham, 1992; RFD, 1992). This change is derived from the fact that the forest lands recently designated for national parks, wildlife sanctuaries, and other protected areas already make up 17 percent of the area of the country. This proportion is thus more appropriate from a watershed management perspective (Tangtham, 1992).

(2) National Forest Policy

It could be said that up to the Fifth NESDP, there was no exclusive National Forest and Land Use Policy in Thailand. It was not until 1985 that the Royal Thai Government (RTG) officially announced the National Forest Policy (NFP). This policy aimed to maintain forest cover on at least 40 percent of the total area of the country of which 15 percent would consist of protected forest and 25 percent economic forest (RTG, 1985). The NFP indicated that the management and development of the forest resources should be coordinated with other resources, and both the government and private sectors should cooperate to achieve the goals of this policy. The NFP emphasizes the role of the private sector in the forest industry and thus came under heavy criticism for favoring the big corporations and industrial conglomerates (Mehi, 1990). Community forests are only briefly mentioned in the NFP.

In 1990, the RFD initiated the Thai Forestry Sector Master Plan (TFSMP) project to improve the policies and processes which affect the protection and management of forests in Thailand. Watershed management is included as one component in the TFSMP (Tangtham, 1992). One objective of the TFSMP is to dismantle the polarization between community forestry and the corporate forestry sector (Bonita and Laitalainen, 1992).

(3) Watershed Classification Measures

In 1985, the RTG, by Cabinet Resolution, also began Watershed Classification in the North³. In fact, watershed classification in this case is synonymous with macro land-use planning. This was undertaken by the Office of National Environment Board (ONEB). Watersheds were classified into five major classifications. Areas located at high elevation with very steep slopes, erosive soil and recently covered by forest (from satellite imagery in 1982) are classified as watershed class 1A (WSC 1A) while areas having similar physical features and environments but that have already been cleared for agricultural use or occupied by villagers are classified as WSC 1B. The WSC 1A must be maintained as protected watershed forest while the WSC 1B zones are allowed to be utilized with intensive soil and water conservation measures or reforestation. The uses of watershed areas in WSC 2 to WSC 5 face progressively fewer restrictions, with the WSC 5 zones open to most agricultural land uses (Table 7.9). The Cabinet Resolution on Watershed Classification set a new policy framework - as an umbrella policy - for the agencies involved in watershed management. Watershed classification began in the Ping river basin, and is planned to cover all the country by 1992 (ONEB, 1990a).

Table 7.9 Watershed Classification and description

Watershed Class 1: Protected or Conservation Forest and Headwater Source

Class 1A includes areas of protected forest and headwater source areas. These areas are usually at high elevations with very steep slopes, and still (and should) remain in permanent forest cover.

Class 1B are areas with similar physical features and environments to class 1A, but where portions of the area have already been cleared for agricultural use or occupied by villagers. These areas require special soil conservation protection measures and, where possible, should be reforested.

Watershed Class 2: Commercial Forest

These areas are designated for protection and/or commercial forest where mining and logging will be allowed within legal boundaries. Most areas are usually located at high elevations, with steep to very steep slopes. Land forms are less erosive than WSC 1A and WSC 1B. Areas may be used for grazing or crop production if accompanied by appropriate soil conservation measures.

Watershed Class 3: Fruit Tree Plantation

These areas cover uplands with steep slopes and less erosive land forms. Areas are usually used for fruit trees or certain agricultural crops. Some areas may be used for commercial forests and grazing. Soil conservation measures are required.

Watershed Class 4: Upland Farming

This class describes those areas of gentle sloping lands, suitable for row crops, fruit trees, and grazing with a moderate need for soil conservation measures.

Watershed Class 5: Lowland Farming

These are gentle slopes or flat areas used for paddy fields or other agricultural uses with few restrictions.

Source: Tangtham, 1988.

**(4) Master Plan for the Development of Community and Environment and
Narcotic Plant Control in the Highlands**

In 1992, the RTG, by Cabinet Resolution, approved a "Master Plan for Development of the Community and Environment and Narcotic Plant Control in the Highlands, 1992-1996." This master plan is a result of the 1989 RTG policy on national security concerning the hilltribes and narcotic plant production. This cabinet resolution is intended to be the policy framework and guidelines for the government agencies involved in highland development (RTG, 1992). The National Security Council (NSC) is responsible for coordination of the concerned agencies. A central issue is, not surprisingly, about national security regarding the instability of the highland areas and highlanders. This master plan addresses four major problems. First, the political and administrative problems include provision of government services, nationality, settlement, migration, and law enforcement. Second, socio-economic development includes poverty, health care, education, and population growth. Third, narcotic plant problems include opium production, addiction, and drug trafficking. Finally, degradation of natural resources and environment includes shifting cultivation and destruction of watershed forests.

This plan aims to stop migration in the highlands and arrange permanent settlements in order to integrate the highland community into the mainstream society; stop opium growing and consumption among the hilltribes and suppress drug traffickers and their influences; develop the natural resources and land use planning

to sustain the ecological system in the highlands. This master plan constitutes a comprehensive policy to solve all related problems in the highlands. The Third Regional Army is responsible for coordination in the whole northern region, the Provincial Hilltribe Committee at the province level, and the District Hilltribe Working Committee at the district level.

In short, the most recent policy frameworks of the RTG which constitute the guidelines for concerned agencies responsible for socio-economic development and environmental conservation in the upland and highland watershed areas of Northern Thailand are:

- (1) The Cabinet Resolution on Watershed Classification and Land-Use Practice in watershed areas.
- (2) The Cabinet Resolution on Development of Community and Environment and Narcotic Plant Control in the Highlands.
- (5) Watershed Management Programs in Northern Thailand

The Upper North has been considered the most important region in Thailand in terms of watershed management because it is vital for the well being of the central plain - the rice basket of Thailand. Government efforts in development of the watershed in this region are reflected in the budget of 2,500 million baht used to develop the highland areas during 1982-1988 (RTG, 1992).

According to the administrative structure and bureaucratic system in Thailand,

the processes of policy making and plan formulation in watershed management are depicted in the schematic processes shown in figure 7.1.

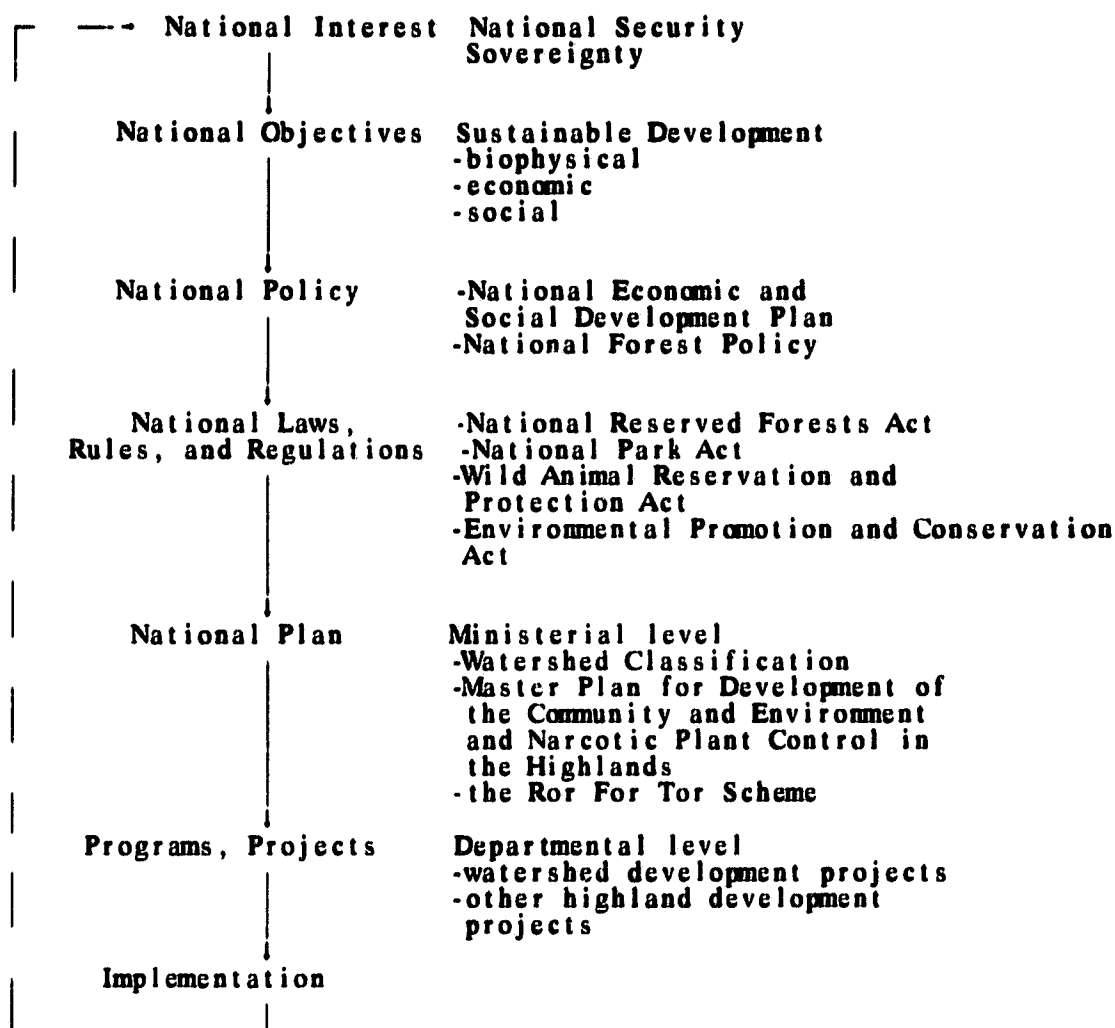


Figure 7.1 Schematic policy process of watershed management in Northern Thailand (adapted from Khambanonda, 1971)

As seen in Figure 7.1, watershed management in Northern Thailand is implemented through the special programs or projects in specific areas. In 1953, the RFD began the rehabilitation programs in the North by reforestation of denuded headwater areas

that had resulted from shifting cultivation. Activities in the earlier period aimed at searching for suitable forest trees and fruit trees for reforestation rather than undertaking any watershed research or extension (RFD, 1992). Due to a lack of knowledge in watershed research and management, the program was based on the assumption that only forests can maintain optimal yields and distribution of water. There was no real concept of integrated management of all kinds of natural resources in the watersheds (Tangtham, 1992).

In 1957, the RFD initiated soil and water conservation activities with a focus on soil losses from shifting cultivation. However, there was no extension program to implement soil and water conservation measures, and no consideration of socio-economic elements and their impact on resource management.

In 1964, realizing the problems faced in coordinating watershed management activities, the RTG initiated an inter-institutional watershed management program by setting up the "Committee on Watershed Management and Development". The purpose was to establish workplans for river basin and watershed management for the whole country. The current concern at that time was the siltation in the reservoir of the Bhumibhol Dam in Tak province. This Committee, however, with minimal support from the government and inadequate cooperation among the fragmented agencies, was ineffective and finally faded out some years later.

Since the 1970s, the RFD has begun to realize that without taking into account the watershed inhabitants in watershed rehabilitation, efforts to stop deforestation and land-use conflicts would be far from successful. Consequently, a

number of socio-economic development plans were formulated and implemented aiming to replace shifting cultivation in highland watersheds (Table 7.10).

Table 7.10 Watershed management and development projects in Northern Thailand

Projects	Duration
1.Mae Sa Watershed Management Project	1972-1981
2.Mae Chaem Watershed Development Project	1980-1989
3.Sam Mun Highland Development Project	1987-1991
4.Wiang Pha Highland Development Project	1988-1993
5.Doi Pae Per Highland Development Project	1990s
6.Mae Lai People Participation Irrigation Project	1987-1991
7.Thai-German Highland Development Project	1981-1993
8.Highland Agricultural Marketing and Production	1973-1984
9.Opium Replacement Project	1978-1983
10.Coffee Research and Development Center	1983-1987
11.Thai-Norway Highland Development Project	1983-1987
12.Thai-Australian-World Bank Highland Agricultural and Social Development	1980s
13.Canadian Assistance Program	1982-1993
14.Royal Project	1981-1983
15.Doi Tung Development Project	1973-1983
	1987-now

The latest scheme to restore forests and watersheds in the North was initiated in 1992, known in Thai as the *Ror For Tor Project* (The Accelerated Rehabilitation of Watershed Forests Project). This project aims to revive deteriorated watersheds and reserve forests in the Ping, Wang, Yom, and Nan river basins (Figure 3.1). The project has a five-year time span with an initial budget of 1,883.20 million baht (approximately CD\$ 96 million). In addition to the various government agencies included in the project, non-governmental organizations are also involved in both the

planning and implementation process. Some of the more than 3,500 villages illegally settled in the watershed areas may have to be relocated (Bangkok Post Weekly, 18 September 1992). The field operations of the project will employ the management model of the Sam Mun Highland Development Project (Jingsoongnern, 1992, personal communication).

(6) Community Forestry Policy

Community forestry was overshadowed by the conventional forestry policy focusing on commercial or industrial forestry (Mehl, 1990). Although the 1985 National Forest Policy (NFP) does mention community forestry there is no legal basis for the local communities to be able to manage their forests. In contrast, the laws and regulations (e.g., the Forest Farm Act B.E. 2535) facilitate large-scale commercial forestry over community-based forest management.

In 1989, a resource use conflict arose between an entrepreneur and the villagers over the forest in Ban Huey Khaew, San Khamphaeng district, Chiang Mai province. The villagers considered the disputed forest as a communal resource while the entrepreneur claimed it was a degraded forest for which a concession should be given by the RFD to the private sector (Roddan, 1993). The RFD settled the dispute by awarding the villagers the right to manage the forest. The RFD's policy on commercial forestry was criticized by academics and NGOs because it caused more encroachment. The farmers sold their land to the tree-plantation firms and then

moved further into the forest reserves seeking new land.

In February 1990, the RFD held a seminar to define the community forest, the role of the local communities and the RFD in community forestry, and possible institutional tools for local communities to manage the forest. In June 1990 the RTG appointed a working subcommittee to draft a community forest law. This subcommittee was composed of RFD officials, academics in the fields of forestry and social sciences from the regional universities, and representatives from the NGOs.

The subcommittee recommended a policy on community forest that any existing community forest under 500 rai that has been initiated and managed by the villagers should immediately be recognized as such by the RFD. Any community having a community forest with more than 500 rai but less than 2,000 rai would have to file an application to the provincial governor in order to be granted such status. Community forests with more than 2,000 rai but less than 4,000 rai would have to get approval from the Director-General of the RFD. Community forests with more than 4,000 rai would have to be approved by the Minister of Agriculture and Cooperatives. The subcommittee, at that time, decided not to draft new legislation but to use the existing forest reserve laws (Faichampa, 1990).

However, a community forest law was drafted later and proposed to the parliament. It is still waiting to be passed whereas the Forest Farm Act B.E. 2535 (1992) which opens more opportunities for the private sector to be involved in forestry industry has already become law. This reflects the policy of the RTG which considers a large-scale tree plantation by the private sectors as a means to meet the

target of having 40 percent of forested area in Thailand.

7.2.2 Effects of Government Policy in the Four Communities

Despite the fact that the watershed forests are under the jurisdiction of the RFD, government officials have for a long time chosen to refrain from asserting authority over the community watershed forests. This is probably because most of the CBWM initiatives in the North have emphasized watershed protection rather than appropriation of resources. Most of the activities of the CBWM are also compatible with the government policies such as watershed classification and community forestry. None of the four communities studied are in areas directly affected by the government watershed management projects mentioned above.

The involvement of the government in community-based watershed management can be constructive or obstructive. The government officials, the RFD in particular, have just become involved in CBWM recently, after the local institutions were established. In one case, the RFD even attempted to take over the community watershed forest by proposing to gazette the highly-publicized CEWM of Ban Thung Yao in Lamphun province to become a national park, but failed to convince the local people to allow it to do so. In the present situation, the best the government can do, or should have done a long time ago, is try to ally itself with these local institutions to push forward the watershed conservation policy - tasks that the government agencies themselves have failed to achieve on their own.

The field survey about government recognition of CBWM indicates that almost 99 percent of the respondents overall are optimistic about the positive role of the government in acknowledging the *de facto* rights and the capabilities of local communities (Table 7.11).

Table 7.11 Percentage of households indicating that the local institutions of CBWM have gained government recognition

Government recognition	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	2.8	1.2	1.5	-	1.6
yes	97.2	98.8	98.5	100.0	98.4
Total	100.0	100.0	100.0	100.0	100.0

If it had been 10 years before, the government attitude would have been different. During those days the local people were usually considered harmful to watershed forests rather than potential guardians. In addition, government policies, for the first time, addressed encouragement of local organizations and popular participation in the Fifth National Economic and Social Development Plan (NESDB, 1982; Rigg, 1991). These policies have been carried on until the present plan. However, policies and actions are a different story when dealing with the real issue of sharing and delegating the power over the resources.

The government has recognized and supported CBWM because the local institutions are congruent with the present government policies such as the logging ban and watershed protection as well as national forest laws. Conversely, in the case

of Ban Luang where appropriation of trees for house building is loosely controlled, the forestry officials are suspicious about the effectiveness of the local system as well as the sincerity of the villagers. Besides, cutting trees in forest reserves is illegal. The attitude and reaction of the forestry officials at the local detachment towards the CBWM of Ban Luang is relatively cool.

Among the four communities, Ban Luang, Silalaeng, and Ban Pae all have gained publicity for their success in protecting watershed forests. They have received a variety of awards from government organizations, especially the RFD and the conservation-oriented NGOs. They have drawn attention from public relation agencies and the media from both national and international networks. Any activity that jeopardizes these CBWM initiatives will certainly stir up public opposition. This can be considered an effective safeguard against the assertion of state property rights and change in government policy. Thung Khai Hang may not receive such high publicity, nonetheless, its effort to protect watershed forest deserves the same recognition as those of others.

Conflicts in resource use and violation of operational rules may not be solved or settled by local institutional arrangements in every case. In such cases the local organizations may resort to a "third party" outside the community. The third party could be official intermediaries, the judicial system, or others. Overall, the survey results show that the third party preferred by most of the respondents is law enforcement by the justice system (Table 7.12).

Table 7.12 Respondents' preferences for third-party resolutions, by community

Third-party resolutions	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
the officials	41.5	3.5	-	-	15.3
law enforcement	51.9	96.5	100.0	100.0	82.4
others	6.6	-	-	-	2.3
Total	100.0	100.0	100.0	100.0	100.0

Among the four communities, Thung Khao Hang and Ban Pae are rigorous in terms of third-party resolution, i.e., law enforcement. They want the rule violators, essentially the law breakers, to be prosecuted by legal procedures to avoid the patronage system in the community. Silalaeng also leans toward the rule of the law with a 96.5 percent preference. Ban Luang has 52 percent in favor of law enforcement, and 41.5 percent suggest government officials as the intermediaries. Strictly applying the rule of the law in the case of Ban Luang may cause conflicts with operational rules which allow forest appropriation for domestic uses such as house building and fuelwood.

In summary, the government policies and development plans in the watersheds of Northern Thailand are preoccupied with key problems, i.e., national security, narcotic plant control, and destruction of the watershed resources. These problems largely involve the highland areas and the highlanders (mainly the hilltribes). Efforts to tackle these problems were implemented through various development projects funded by the RTG budget and foreign aid. The most recent policy frameworks for watershed management are the cabinet resolutions on Watershed Classification and

the Master Plan for Development of the Community and Environment, and Narcotic Plant Control in the Highlands. None of the four communities are directly involved in the watershed development projects. The effects of government policies on community-based watershed management are, so far, positive in terms of recognition. The government has acknowledged the existence of community-based watershed management, but no substantial support and actions have materialized.

7.3 Constitutional-Choice Rules

This level of rules, and level of analysis, is involved with the processes of formulation, governance, adjudication, and modification of constitutional decisions (Ostrom, 1990). The constitutional rules provide the legal framework for the collective-choice rules discussed in section 7.2 which in turn affect the operational rules of CBWM discussed in 7.1. The constitutional rules define the property rights in the watershed forest, assign authority to government agencies, and define the rights and duties of the people concerning the watershed forest. This level of rules includes the constitution, laws, government decrees, ministerial regulation, and orders.

7.3.1 Legal Framework of Watershed Management

More than two decades ago, Khambanonda (1971) concluded that the failure

in conservation and protection of forests and natural areas in Thailand could mainly be attributed to the lack of law enforcement and the defects of the policy, laws, and programs for conservation and protection of such resources themselves. A decade later, Kilakuldilok (1981) attributed the ineffectiveness of government efforts in solving the problems of watershed degradation to a familiar list of reasons, i.e., institutional weakness in all aspects of conservation, lack of political will, rapid population growth, and lack of a coherent long-term policy (cited in Blaikie, 1985: p.47). To date, though parts of these problems have been dealt with, the issues still exist.

Evolution of the legal framework for forest governance can be traced back to the late 19th century. Prior to 1899, forests in the North were mostly exclusive properties of feudal chiefs and local princes (Bhumibhamon, 1986). The richest teak forests belonged to princedoms, notably that of Chiang Mai, Lamphun, Lampang, Phrae and Nan. In 1896 the RFD was established, and a year later the first forest protection law was promulgated assigning state property regime to the forests. In 1899, ownership and control of all forests were transferred from the local princes to the RTG in Bangkok. Since then several laws and regulations on forests and forest lands have been promulgated. The laws in this period were government tools to extract revenue from forest resources rather than for conservation (Feeny, 1988a).

The existing laws which directly govern watershed management either by mandatory duties or by jurisdictional areas are:

- (1) The Forest Act B.E. 2484 (1941)

- (2) The National Reserved Forest Act B.E. 2507 (1964)**
- (3) The National Park Act B.E. 2504 (1961)**
- (4) The Wild Animals Reservation and Protection Act B.E. 2535 (1992),
replacing the 1960 Act**
- (5) The Environmental Promotion and Protection Act B.E. 2535 (1992),
replacing the 1975 Act**

The first four acts are enforced by the RFD while the fifth is enforced by the Ministry of Science, Technology and Environment under the supervision of the National Environment Board (NEB)⁴. The Environmental Promotion and Protection Act, Article 43, however, has authority on watershed protection only in areas outside the jurisdiction of the first four acts and not covered by any existing authority. In addition to the above mentioned legislation, the Land Development Act B.E. 2526 (1983) also authorizes some activities involving watershed management, especially in upland areas. The Department of Land Development (DLD), which is the mandatory agency under this law, has launched many programs concerning soil and water conservation in watershed in the North.

Generally, researchers, such as Khambanonda (1971), Bhambhamon (1986), and Tangtham (1992) feel that the available laws and regulations are sufficient for watershed management. The main problem is lack of enforcement. In many cases, enforcement has not been according to the purpose and principle of the law. Loopholes in the law are often manipulated to generate benefits to some parties at the expense of marginal resources and marginal people.

The politicians and the government seem to pay less attention to the legislative role than the political role (Khambanonda, 1971). Law enforcement is not taken seriously by the officials in charge. For example, many officials do not consider the Cabinet Resolution on Watershed Classification as a regulation, but a mere policy that the concerned agencies are suggested to comply with. This makes enforcement for watershed classification less effective than the regular laws (Tangtham, 1992; Jingsoongnern, 1992, personal communication).

A lack of cooperation among the related agencies is not uncommon in Thailand where there are 42 agencies in 9 ministries involved in water resource management including watershed management (Bower and Hufschmidt, 1984). This makes it difficult to achieve the integration which is required for efficient and effective management. Recently, the RTG set up a central agency to oversee the country's policy on water resource management⁵, and considered modifying the water-related laws to form a water code, like a land code.

Some observations arise from the legal framework of watershed management in Thailand in general and the northern region in particular. First, the focus of watershed management and development since the early period until recently emphasized the "headwaters" (*Ton Nam*) or the upper watershed rather than the overall watershed areas including downstream. This can be observed from the number of watershed management and development projects targeting the highland areas and the highland occupants. Although the RFD has recognized the definitions and concepts of "watershed" in accordance with those accepted in the academic

community (RFD, 1992), it tends to identify with the term *Ton Nam* (headwater) rather than the term *Lum Nam* (watershed). The RFD, especially the Division of Watershed Conservation, narrowly defines its responsibilities on watershed management as the protection of the headwaters or the upper part of the watersheds. This results from the mandatory jurisdiction of the RFD which is confined to forest lands. Upland areas on the other hand fall within the responsibility of the Department of Land Development, and other parts of watersheds may be left to other agencies. Consequently, it is quite common for each agency to concentrate on a narrow framework rather than to look at the whole picture. This results in a lack of cooperation and coordination across the agencies involved in watershed management. Well-planned and integrated projects may fail to bring about the expected outputs due to failure in implementation.

Secondly, although watershed management in Thailand has developed considerably in recent years, there has been little institutional change, especially in terms of property regimes or authority system in the watershed. Most of the efforts invested to cope with the critical problems of watershed degradation were set in the old institutional framework designed to suit the situation three decades ago. This resulted in the limited success of many watershed development projects (Pereira, 1989). Any initiative to change the institutional arrangements has been resisted by the status quo and impeded by the established structure of the bureaucratic polity. For instance, a current move to promulgate the Community Forest Act, although some progress has been made in the legislature, is still pending for review and little

institutional change can be expected.

7.3.2 Effects of Constitutional Rules in the Four Communities

In terms of the resource regime, the watershed forests of the four communities studied are under the governance of the state. By and large, these forest areas are under the jurisdiction of the RFD whose authorities are defined in the laws mentioned in 7.3.1, and its activities are guided by the policies discussed in 7.2.1. The effects of the constitutional rules on the CBWM depend on what kind of law is governing the area of the particular community watershed.

In the case of Ban Luang, the watershed forests are in the national reserve forest and classified by the Watershed Classification System as watershed class 1A (WSC 1A). Parts of this area, particularly in Tambon Pi, are also in the Doi Pha Chang wildlife sanctuary (Figure 3.3). Under these regulations the state has absolute rights to manage the watershed forest. The villagers must comply with the laws, i.e. the National Reserve Forest Act, the Wild Animal Preservation and Protection Act, and the Cabinet Resolution of Watershed Classification. Although in practice this local community has been allowed to manage the watershed forest for the benefits of their livelihood, the state still has the legal rights over the entire watershed area.

Silalaeng is slightly different from Ban Luang in terms of external arrangements. It has come to the brink of conflict over the rights to manage its watershed forest when the government was preparing the area for the new National

Park which included the protected watershed forest of Silalaeng. Under the National Park Act, the villagers will be deprived of the rights to manage and use the watershed resources which they have enjoyed under their CBWM. With the fear of losing control of the watershed forest which they have worked so hard to protect, the Tambon Council moved forward to negotiate with the RFD officials to partition the community watershed forest from the park. The park officials agreed to draw the boundaries of the watershed forest for Silalaeng to maintain its *de facto* rights over the specified area. This incident reflects the current policy of the RTG in promoting the role of the local community in watershed protection. However, in practice, the recognition of the right to manage the local watershed forest seems to be considered on an individual case basis.

The watershed forests of Thung Khao Hang and Ban Pae are both parts of the national reserve forest, as are most of the forest areas in the North. National reserve forests are normally declared by a ministerial decree under the provision of the National Reserved Forest Act B.E. 2507. Ban Pae has obtained recognition from the government at a wider scale than Thung Khao Hang. This provides Ban Pae with strong immunity from the threat of assertion of the state property regime and pressure from the market forces as well. In this regard, Thung Khao Hang may feel less secure in its CBWM from reclamation as a national reserve forest if changes occur in the legislation or government policy.

The perception of the villagers about the status of their watershed forests may not coincide with the actual legal status defined by the laws. In Thung Khao Hang

and Ban Pae, more than 90 percent of respondents perceive that the status of their watershed forest is national reserve forest (Table 7.13). In Silalaeng, the perception of legal status varies between the national reserve forest (30.2 %), the national park (20.9 %), and the watershed class 1A (30.2 %), which all are correct depending on the application of legislation at different period of time. In Ban Luang, perceptions are divided between national reserve forest (53.8 %) and watershed class 1A (34 %), and both are correct.

Table 7.13 Perception of the members of each community about the legal status of their watershed forest

Legal status	Ban Luang	Sila-laeng	Thung Kha J Hang	Ban Pae	Total
don't know	9.4	10.5	1.5	4.2	7.2
national reserve forest	53.8	30.2	92.4	91.7	61.4
national park	0.9	20.9	-	-	6.2
watershed class 1A	34.0	30.2	6.1	2.1	21.9
public land	-	1.2	-	-	0.3
others	1.9	7.0	-	2.1	2.9
Total	100.0	100.0	100.0	100.0	100.0

In general, the villagers usually assume that the forests belong to the state. Unfortunately, they tend to exercise less restraint on the use of state property than private property and common property to a lesser extent. Except for the community watersheds, the forests are treated as open access - the state property is everybody's

property.

At this point, there is no doubt that the watersheds are under the state property regime. The state uses the laws to exercise the rights on the watershed through the government agencies. The RFD is the main agency that has jurisdiction in the watersheds. In practice, in many rural areas, the local communities have maintained their *de facto* rights in managing the local watersheds. The government chooses not to assert the rights to intervene in the community-based watershed managements because the purposes and activities of those local institutions are not in serious conflict with the *de jure* rights of the government.

Summary

Institutional analysis of community-based watershed management (CBWM) involves three levels of decision-making arrangements, or simply three levels of rules. This study particularly focuses on the lowest level of rules, that is, the operational rules at the community arena. The watersheds, as common property resources, are governed by the local institutions to ensure equal rights in joint use among members of the community and at a rate not exceeding the capacity of sustained yield. The operational rules vary among the different communities reflecting the constraints in physical attributes of each watershed and the socio-economic conditions of the community settings. However, this study would not present a comprehensive institutional analysis if did not include the other two levels of analysis, because the

lower level rules are usually nested in the higher level rules. The collective-choice rules mainly involve government policies and development plans for the government officials to implement in the locality. So far, government policies tend to be positive and acknowledge the CBWM. The four communities in this study are not the recipients of government watershed development programs, but self-managed community watershed forests. For the constitutional rules, at present, the state still maintains an absolute ownership of watershed forest. The state can exercise its rights through a variety of existing legislation. It appears that congruence of the three levels of decision-making arrangement is a critical factor for the viability of CBWM. In other words, the *de facto* rights of local people in the local watersheds must not be sharply contradictory to the *de jure* rights of the state over the watersheds.

Notes

1. These problems have been studied, scrutinized, and documented by many scholars and researchers from various areas of study, both Thai and foreigners. The most related works include ones by Kunstadter, Chapman, and Sabhasri (1978), Kunstadter (1980), Chapman (1980), McKinnon and Bhruksasri (1983), Uhlig (1980), Hoare (1986), and Filipchuk (1991). Some case studies have also focused on specific watersheds such as Tan-Kim-Yong *et al.* (1988) and Dearden (1992).

2. There was no scientific, economic, or social reason supporting why this figure was chosen at that time. Even the figure of 40 percent adjusted later, 20 percent in protected forests and another 20 percent in productive forests, was first suggested in 1948 by Mr. Garritt Danhoff, a Dutch forestry expert of the FAO Mission to Thailand. This suggestion was, however, based on his personal opinion, not on any comprehensive study because no such study had been done at that time (Khambhonda, 1971).

3. Watershed Classification was first undertaken in the Ping and Wang river basins in 1985, and Yom and Nan river basins in 1986. Then this measure was extended to the Northeast and the South, and is expected to cover all over the country in 1992-1993. More details are available in Tangtham (1988) and Office of National Environment Board (1990a; 1990b).

4. According to the new Environmental Quality Promotion and Protection Act B.E. 2535, the Office of National Environment Board has been reorganized into three departmental agencies to deal with a variety of environmental problems. They are the Department of Pollution Control, Department of Environmental Quality Promotion, and the Office of Environmental Policy and Planning. These new agencies are under the Ministry of Science, Technology, and Environment (formerly Ministry of Science, Technology, and Energy).

5. Before that, the National Hydrology Committee established the river basin information system by dividing the entire country into 25 river basins or main watersheds for concerned agencies to use as a reference unit in planning and management (Tangtham, 1990). Each river basin is sub-divided into watersheds and sub-watersheds with standard code names.

Chapter 8

Resource Use

Watershed resources under common property systems are supposed to be jointly used by a clearly defined group of users. Community-based watershed management basically refers to the patterns of resource use in the context of local ecology, economy, and polity. However, these local contexts are also defined within wider regional and national influences (Hirsch, 1993). This political economy of resource use is taken into consideration in analysis of the pattern of behavior of the resource users, assessment of outcomes of resource use in the watershed systems, and the prospect of changes in the local community. The three sections in this chapter are organized to reflect these factors. The theoretical background underlying the discussions was outlined in Subsection 2.5.3.

8.1 Patterns of Interaction in the Use of

Watershed Resources as the Commons

As discussed earlier in the conceptual framework, cooperation and reciprocity are the most important elements of interaction needed in common property resource management. Theoretically, the pattern of behavior in Thai peasant society has been

characterized by Embree (1950) as a loosely structured social system¹. However, Potter (1976) argues that the loose structure model was problematic from the beginning, in the selection of Bang Chan as the site of study. Bang Chan, located on the outskirts of Bangkok, is an unusual community which has no clearly defined boundaries, with a short history of settlement, and is ethnically diverse. Potter (1976) strongly opposes the "loosely structured model" of Thai peasant society by presenting evidence from study in the village of Chiang Mai², Northern Thailand.

Chiang Mai village is a corporate group in that it has an independent social identity and owns common property, and its people have organized themselves to make decisions for the village community as a whole (Potter, 1976: p.35).

In Northern Thai society, there exists a pattern of reciprocal behavior and collective activities in the village community, along with the villagers' sense of affinity for their community (Moerman, 1968; Potter, 1976).

In a broad sense, Scott's (1976) moral economy approach is more appropriate to portray peasant collective behavior in the Upper North than Embree's loosely structured society model. One reason for this is that patron-client relationships (known as the *Pawliang-Luknong* system) or the entourage regulated by an ethic of reciprocity have prevailed in *Lanna* for a long time (Van Roy, 1971). Cooperative ethic is the basis for the organized social life of the community such as a cooperative labor exchange (Potter, 1976). Furthermore, rebellions of the collectively-organized peasants against infringement by the state have also occurred in this region (Vaddhanaphuti, 1984).

In this study, the revolt of the farmer group against a logging concession in the

watershed of Ban Luang can be more or less explained by the tenet of the moral economy approach. However, the application of the moral economy model of peasant collective behavior in the present situation in the North must be more specific to the community setting³, and other factors must be taken into consideration as well. The existence of cooperative activities and evidence of group formation in the North have to be set against a background of ecological differentiation, local processes of state formation in the pre-modern period, and considerable regional instability (Kemp, 1991). Buddhism may also influence the moral economic action in the distinctive Thai peasantry⁴ (Keyes, 1983b).

In the traditional cooperative activities, individual villagers had to depend on the willingness of another villager to volunteer in order to gain that individual's cooperation in such an activity. This was true not only for reciprocal activities based on dyadic relationships, but also for those collective activities organized at the village level. This happened when resources were abundant in comparison with the population. With such a circumstance, it was easier to secure enough cooperation through keeping good relationships with others, rather than by controlling the actions of others through a variety of rules.

In the past, it was labor not land that was scarce and was the most important resource which had to be secured from others through cooperative action. Cooperative labor exchange, which is known in Thai as *ao raeng*, *ao mu* or *au wan* (depending on the different dialects), was the practice through which individual households procured needed labor from the others. Cooperative labor exchange was

helpful in rice farming, transplanting, harvesting, and threshing requiring large amounts of labor for a short period of time. This cooperative labor exchange is quite strict in maintaining equality in the amount of labor or duration contributed. This type of labor exchange is not at all like labor exchanged through market transactions (Oakerson, 1988). Since it is limited to people in households with whom a villager maintains good relationships it occurs only upon the willingness of a villager to help (Shigetomi, 1992).

The cooperative activities also extend to the major rituals in the life cycle of household members which require large amounts of money, and most households cannot cover all the costs on their own (Potter, 1976). Thus other households will contribute money, rice, and other necessities. These cooperative activities are organized on dyadic relationships. This relationship is fundamentally based on the willingness of people to volunteer their help. Nonetheless, people also feel a sense of obligation that they must express their sincerity to help to maintain the dyadic relationship with fellow villagers. Shigetomi (1992) calls this type of cooperation an "obligatory voluntaryism." It was found in the case of Ban Luang where this kind of cooperative labor exchange has also been used in appropriation of forests for building a new house.

Shigetomi (1992: p.162) has defined a community in the North as "a territorial organization." In this sense, it is proper to comprehend the village as a social unit as well as a geographical unit. The early period of settlement in the North was mainly located in the forest where folklore held that the evil spirits lived. The first settlers

usually clustered their residence together not only to protect themselves from wild animals but also to cooperate in protecting themselves from evil spirits (*Phi Paa*). A common scene found in the village communities of the North is the village shrine built for the guardian spirit known in the North as *Phi Sua Ban*, or *Phi Pu Taa* in the Northeast, to protect against evil spirits. It was believed that efforts by individual villagers or by each household were not enough to resist the *Phi Paa*. Once the territory protected by the village guardian spirit is blended with the village's collective obligations, the residents of that territory also come to recognize standards of behavior that have to be maintained so that no one in the village will act in a way that could anger the guardian spirit; for should it no longer protect the village, all the villagers would be in jeopardy. One villager's irreverent act is not just the problem of that individual; it is the communal problem of the whole village. Within this sphere of belief, the villages in the North can be recognized as territorial organizations in which the villagers have a feeling of attachment and obligation to their own village (Potter, 1976). For the above reason, membership of the villagers has to be clearly defined to be able to identify who belongs to the village and who does not.

In the North, cooperative activities have been particularly important in managing the natural resources, especially water for agriculture. As mentioned earlier, the people of the North have traditionally established cooperative organizations of water users known as the *Muang Fai* system. Along with the water resource, in many communities, the forests at the headwaters of the streams have

also been protected, or otherwise the uses of these watershed forests have usually been regulated as communal resources (Ganjanapan, 1992). It was this traditional cooperation, obligation, and attachment of the villagers to the definite territorial and social units that the community-based watershed managements initially emerged from in the North.

The most important motivation that brings the members of the community together to cooperate in CBWM is to protect the watersheds from further degradation especially in the headwater areas. It was found from the survey that 82.7 percent of respondents are concerned over the consequences of mutual destruction if watershed forests are left unprotected (Table 8.1). The prime motivation is rooted in the need to maintain the water supply.

Table 8.1 Motivations for cooperative actions in community-based watershed management

Motivations	Percentage	Cases
headwater protection	82.7	253
outside threats	6.9	21
distrust officials	0.6	2
inspired by leaders	4.6	14
others	5.2	16
Total	100.0	306

The management of local resources using a community watershed approach in the North is different from that of other regions. The village communities of

Central Thailand are totally different for they are not clearly defined as territorial organizations as are those of the North, which are the "natural communities" (Keyes, 1970). In central Thai peasant community, the traditional sense of cohesion and obligation among the villagers is weak. Moreover, there are very few natural resources that belong to only one village to provide a sufficient basis for the communal ownership of such resources (Suigetorni, 1992).

In the four communities, like in other rural communities in the North, dyadic relationships and traditional reciprocal activities still function effectively in many aspects of everyday life. A labor exchange system is still used in rice cultivation and harvesting. However, hired labor is also available. Traditional cooperation in the rite of passage, such as ordinations, weddings, building new houses, and funerals within the community still exists. The form of contribution, while labor, rice, and material are still dominant, is tending to change to cash donations.

It is important to be aware that rural society is not static nor isolated but is being incorporated into the wider society. Analysis of cooperative activities must consider the rural communities in the stream of change. This topic will be discussed in more detail in Section 8.3.

8.1.1 Cooperation and Associated Variables

The field survey at the household level was designed to investigate the individual's choice of actions in a common property regime in CBWM. In the actual

field survey, the investigator had to ask questions in a judicious manner to obtain honest answers since the questions concerned illegal actions. A lot of time, patience, and a series of probe questions were needed to gain trust. Nevertheless, gaps between words and deeds still exist. All in all, final decision making on individual action is a matter of the internal world of the individual conditioned by mental images of obstacles and inducements in a relevant environment (Ostrom, 1990; Oakerson, 1992).

Given the above circumstances, more than 97 percent of respondents overall indicated that they always accept and comply with the rules in the use of watershed resources (Table 8.2).

Table 8.2 Percentage of households complying with the rules of community-based watershed management

Patterns of interaction	Percentage	Cases
defect	2.6	8
cooperate	97.4	298
Total	100.0	306

It is not surprising that the percentage of cooperation is so high because community-based watershed management can emerge and survive only when the majority of users commit to cooperative activities and keep an obligation to other members of the community. There are, however, 8 cases (2.6 %) who determined that they would defy the rules of the community watershed forest. All of them are

in Ban Luang. Many of them believed that they did not do any harm to the watershed overall. They understood that the rules were applied to ones who appropriated the watershed resources for the purpose of commercialization only. However, one person indicated that he did not comply with the rules because he has seen that a rich and influential person did not receive punishment even after breaking the rules.

According to the conceptual framework, it was hypothesized that individual choice (cooperate or defect) is directly affected, though not determined, by the physical and technical attributes of the watershed, the socio-economic conditions of the community setting, and the decision-making arrangements. The relationships between these variables were supposed to be analyzed statistically. However, the 8 cases of non-compliance are too few to use inferential statistics. Thus analysis of the relationship was based on qualitative data observed during the field work. Cross-checking the background of these 8 cases also help to understand why they choose to defy the rules whereas the majority cooperate.

It was found that 6 out of the 8 cases perceived the watershed forests as a state-property resource, and 2 as a common property resource. Meanwhile more than 74 percent of repondents who complied with the rules were the ones who perceived the watershed forest as common property resources. That is, individuals who perceive the watershed as state property resource are more likely to defy the rules than those who perceive the watershed as CPR. The reason, as mentioned earlier, is that the villagers tend to treat state property as open access. In contrast, with a communal

resource, the villagers have a sense of attachment and obligation with other community members as they maintain reciprocity within the village community. It was also shown that 6 out of these 8 cases never participate in rule-making procedures. Thus it might be possible that they did not understand the reasons for the rules, or they did not know the details of the rules.

Six of the 8 are still seeking new farmland. This marginal group of villagers is desperately dependent on the forest land in the watershed for their living. They feel that the rules prohibiting the expansion of land in the watershed are not fair to them, who mostly are landless peasants. This group of people, however, are a small number in comparison with the rice farmers in the community. However, they may be farmers who have just lost their lands by selling out, or have become marginalized through indebtedness. Amongst the respondents who cooperated with the rules, over 72 percent were not seeking new farmland.

In short, the above discussion is about the determination of individual users concerning cooperation in the use of watershed resources. Endurance of community-based watershed management depends on the commitment of members of the community to cooperate and comply with the rules. However, individuals' decisions may change when confronting a real situation in day-to-day activities. This will be discussed next.

8.1.2 Opportunism and Associated Variables

One strategy which individuals may choose in the use of common property resources is opportunism or shirking. The amount of opportunistic behavior is most important for the expectations of appropriators who share the rules with other appropriators. If a large number of appropriators act opportunistically or feel that the others also act opportunistically in such a setting it is difficult to develop stable, long-term commitments to cooperation (Ostrom, 1990). In this situation, tough monitoring and sanctioning mechanisms are needed. In a community in which there are strong rules against opportunistic behavior, each appropriator will be assured that he will not be a sucker.

During the household survey, villagers were asked about the possibility that they might choose a free riding strategy if the opportunity was open to them (V.42). It was found that 10.5 percent of the respondents overall indicated a possibility of opportunistic behavior (Table 8.3).

Table 8.3 Percentage of respondents indicating a possibility of opportunism in use of watershed resources, by community

Opportunism	Ban Luang	Sila- laeng	Thung Khao Hang	Ban Pae	Total
no	72.6	93.8	98.5	97.9	89.5
yes	27.4	1.2	1.5	2.1	10.5
Total	100.0	100.0	100.0	100.0	100.0

Ban Luang has the highest percentage, 27.4 percent, in comparison with 2 percent or less in the other communities. The difference is statistically significant ($\chi^2 = 49.50$, $P < 0.001$). This difference arises because Ban Luang's operational rules are relatively loose and the mechanisms to enforce the rules are flexible among different Tambon. The size of watershed and large number of users also contribute to this choice.

Despite the overwhelming number of users committed to comply with the rules, as mentioned in subsection 8.1.1, there will be some individuals who will ignore the rules and act opportunistically when given a chance. Furthermore, there are some situations in which the potential benefits are so high that even strongly committed persons will be tempted to shirk. In reality, the overwhelming adoption of rules will not mean the reduction of opportunistic behavior to zero (Ostrom, 1990).

Variables significantly associated with the choice of opportunism are listed in Table 8.4. The direction and strength of the relationship is shown in the contingency tables in Appendix 3. The possibility of opportunistic behaviour (V.42) is a dichotomous variable and most of the independent variables are nominal scale. Therefore Chi-Square (χ^2) was used to test the significance of association between the independent and dependent variables. The relationships indicated here are also based on the participant observation during the field work.

Table 8.4 Summary table of the variables significantly associated with the choice of opportunism

Independent variables	χ^2	D.F.	Sig.
Income	14.73	3	.002
Upland holding size	19.65	4	.000
Status in other social groups	6.77	1	.009
Participation in monitoring	4.06	1	.044
Participation in maintenance	8.63	1	.003
Participation in meeting	5.79	1	.016
Perception about the commons	9.46	2	.009
Making and amending the rules	11.32	1	.000
Conflict resolution mechanisms	50.09	2	.000
Dependence on timber	8.22	1	.004
Dependence on fuelwood	3.92	1	.046
Dependence on cultivated land	27.78	1	.000
Change in local control	8.69	1	.013
Change in threat from outsiders	26.48	2	.000

The physical attributes of the watersheds in terms of size and scarcity of watershed resources make a significant difference in opportunistic behavior. As discussed previously, Ban Luang has a higher percentage of the possibility of opportunism than the other communities (Table 8.3). A large number of users may also contribute to a high chance of opportunistic behavior because of a low degree of noticeability among the co-users.

Low-income villagers (V.18) tend to be more opportunistically-inclined than high-income villagers. This results from, or is related to, the occupation of the

households, which is again related to land use pattern and land holding size. These factors, when combined, determine the degree of dependency on watershed resources of each household. Households with an extremely high degree of dependency on watershed resources are likely to take more chances for they have no alternatives and little to lose.

It also appears that a high possibility of opportunism is associated with a larger size of upland holding (V.22). Households with a large upland holding are also highly dependent on other watershed resources besides the water source. Individual households who are not affiliated with other social groups (V.28) in the community also seem to have a high possibility of opportunistic behavior. Persons who have no social bond and obligation to other people tend to make a choice of action based on self-interest.

Individuals who have participated in cooperative activities such as monitoring (V.29), maintenance (V.30), or meetings (V.31) are unlikely to be opportunists. The possibility of opportunism is high among individuals who perceive that the watershed is state property and open access when compared with those who perceive it as a common property resource (V.32).

The possibility of opportunism is low in the group of individuals who took part in rule making procedures (V.35) since they are more committed to the rules they have created than those who did not participate. For the preferred third party in conflict resolution (V.39), individuals who prefer legal action for the offenders have a lower possibility of opportunism than those who prefer negotiation and other

measures. The reason for this is discussed more extensively in section 7.1, the previous chapter.

Among the categories of dependency on watershed resources, individuals who are dependent on watershed resources for timber (V.46), fuelwood (V.47), and upland cultivation (V.49) have higher possibilities of opportunism than those who are not dependent on the watershed for such resources. These categories of resource use constitute the basic needs of the households without land holdings in the lowlands, and their livelihoods are highly dependent on harvesting all forest resources except water resources. This group of villagers are not just merely the "poor", but rather the "very poor" (approximately 15 percent of the total households, see Table 6.2), and for them sheer survival is the priority, and it is difficult to take a longer perspective on resource conservation. Their livelihood is a desperate struggle for food and other basic needs to survive from day to day (*Yu Pai Won Won* in Thai). They live from hand to mouth (*Haa Chao Kin Kum* in Thai). The same pattern of relationship was also found by Faichampa (1990); that is, communities that protect watershed forests are dependent on the forest and land sufficiently to conserve it, but not to the point of sacrificing their livelihood security. A heavy dependence on watershed resources by the poorest of the poor actually threatens the CBWM because their survival is at stake. At the other extreme, insufficient dependence on watershed resources can similarly threaten the watershed for lack of motivation to conserve it.

The possibility of opportunism is also related to changing situations in the control of local resources (V.55) and the threat from outsiders (V.57). Individuals

who express concern about losing control of local resources and increasing threat from outsiders are prone to opportunistic behavior, when the opportunity occurs. It is therefore important to assure members of the community that local institutions will be able to sustain the flow of resources, and the watershed will be secure from outside invasion.

In summary, opportunism or shirking is a pattern of behavior that could jeopardize reciprocity in the use of common property resource if it becomes the choice of the majority of users. Opportunistic behavior is a possible strategy that all users will face in an attempt to manage common property resources, no matter how well their institutions are devised (Ostrom, 1990).

8.1.3 Free Riding Behavior and Associated Variables

Individuals who admit to have broken the rules at least once account for 3.9 percent of the overall respondents (Table 8.5). The variation of rule breaking events among the four communities is not statistically testable. There are 5 cases in Ban Luang, 3 in Silalaeng, and 2 each in Thung Khao Hang and Ban Pae.

Half of the 12 respondents who broke the rules thought that everybody did the same thing as themselves. This could be interpreted as an obstacle to the choice of a cooperative strategy. Meanwhile one third thought that there was no serious damage to the whole watershed system because the others followed the rules. This shows that the prospect of "riding free" on the contribution of others can be a

substantial inducement (Oakerson, 1992). Only 2 out of 12 violators said that they did not know the rules.

Table 8.5 Overall percentage of the respondents having broken the rules of community-based watershed management

Breaking the rules	Percentage	Cases
never	96.1	294
once	2.3	7
twice	1.0	3
more than twice	0.6	2
Total	100.0	306

In short, community-based watershed management in the four communities has emerged and survived because the majority of members of the communities act cooperatively and abide with the rules. If free riders had been widespread CBWM would not likely have existed to date. It is therefore important to keep the number of free riding incidents to a minimum.

8.1.4 Participation in Cooperative Activities

This study pays attention to three major activities which require the voluntary participation of members of the community. The first is monitoring, which is a basic responsibility for everybody to be the ears and eyes (*Pen Huu Pen Taa*) for the community when strolling in the watershed areas on a daily basis. In this

investigation, however, the main focus is on organized monitoring such as foot patrols in the watershed forest undertaken by the designated monitors. Overall, it was found that 30 percent of respondents have participated in organized monitoring at least once (Table 8.6). Participation in formal monitoring is significantly different between the communities ($\chi^2 = 26.33$, $P < .001$).

Table 8.6 Percentage of participation in formal monitoring in the watershed forest in each community

Participation in monitoring	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	72.6	51.2	97.9	77.1	70.6
yes	27.4	48.8	2.1	22.9	29.4
Total	100.0	100.0	100.0	100.0	100.0

The highest percentage of participation is in Silalaeng which operates a foot patrol in the watershed forest on a regular basis. In Ban Luang, the Khamnan and village headmen sometimes recruit the villagers to go to check out some areas reported to have illegal logging, shifting cultivation in restricted areas, or intrusions from outsiders. These missions rely on information received from the villagers. Ban Pae used to operate a two-man patrol in the forest area at night time during the height of intrusion from its neighbours. At present, this patrol is not necessary. Thung Khao Hang has no organized monitoring because the villagers usually go to the forest everyday and monitoring is everybody's duty.

The second form of participation in cooperative activity is the maintenance

of the watershed forest. This activity may include tree planting, marking boundaries, clearing forest floors, and making fire breaks. Overall, 37.9 percent of respondents have engaged in such maintenance activities (Table 8.7). Difference in participation in maintenance between the communities is statistically significant ($\chi^2 = 88.90$, $P < .001$).

Table 8.7 Percentage of respondents participating in maintenance activities in each community

Participation in maintenance	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	81.1	61.6	74.2	4.2	62.1
yes	18.9	38.4	25.8	95.8	37.9
Total	100.0	100.0	100.0	100.0	100.0

In Ban Luang such maintenance activities are not needed since the watershed forest is so large that the villagers are required only to keep their eyes on intrusions from outside the community. Silalaeng has occasionally required cooperation in marking the boundaries of its watershed forest especially on the border shared with the H'tin of Tambon Phuka. Thung Khao Hang has only 25.8 percent participating in maintenance activities. Its main concern is to leave the designated watershed forest untouched for a period of time to allow replenishment to occur.

Ban Pae has the highest percentage (95.8 %) of respondents who have participated in maintenance activities. It usually arranges a "development day" which requires every household to provide labor to participate in developing the watershed

forest. Activities include tree planting, making fire breaks, clearing the forest floor around the spirit shrine, and the ceremony for the spirit of the headwaters (*Phi Khun Nam*). The ceremony for the spirit of the headwaters is held annually in August to request for the continuing flow of water since the villagers believe that the headwaters are protected by the spirit.

In Ban Pae, absence from cooperative activities is subject to a fine of up to 100 baht a day. This rate has been adjusted periodically to keep up with the increasing rate of wage labor as more villagers bought out their absence in cooperative activities from the higher daily wage earned from town jobs. This is a sign of the penetration of the market economy into the village community. People begin to care about their monetary income more than their moral obligation and attachment to the community. Their choice of action is based on the benefits and costs.

The third form of participation in cooperative activities is to attend village meetings concerning CBWM. In local communities, the village meeting is an arena for decision making about common interests and other activities that need consensus and shared opinions. Not surprisingly, at the village communities, like in Thung Khao Hang and Ban Pae, the percentage of respondents having participated in the meeting of CBWM is as high as 84.8 and 85.4 percent respectively (Table 8.8). Difference in percentage of participation in meetings concerning CBWM between the communities is statistically significant ($\chi^2 = 32.47$, $P < .001$).

Table 8.8 Percentage of participation in meetings concerning CBWM in each community

Participation in the meeting	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	50.9	33.7	15.2	14.6	32.7
yes	49.1	66.3	84.8	85.4	67.3
Total	100.0	100.0	100.0	100.0	100.0

The village meeting is the stage for information exchange, complaints, dispute resolution, and sometimes kangaroo courts. Currently, the role of the village meeting in information exchange is changing because most of the villages have installed broadcasting systems locally known as *Siang Tham Sai* (voice through the wire) which enables the village headman to speak through the microphone from his house without calling the village meeting. However, the village meeting is still necessary in activities where two-way communication is necessary.

In Silalaeng, most of the decisions concerning CBWM are made at the meeting of the Tambon Council. The villagers may not be able to participate directly in the final decision but they still have opportunity to express their opinion at the village meeting before the agendas are advanced to the meeting of the Tambon Council. About 66 percent of respondents in Silalaeng have participated in village meetings concerning the watershed forest. The Tambon Council usually holds meetings once a month and the village meeting is held to correspond with the Tambon Council meeting.

Ban Luang has 49.1 percent of respondents having participated in the meeting

of CBWM. Like Silalaeng, decision making concerning management of the watershed forest are under the responsibility of the Tambon Council. Important issues are sometimes considered at the joint meeting of the Convention of the Khamnan and Village Headmen. The reality is that such meetings are seldom held. Each Tambon has some degree of independence in making decisions concerning the watershed forest within its jurisdiction.

In summary, the need for traditional cooperative organization and activities, especially in irrigation management, has laid the foundation for the domination of cooperation and reciprocity in CBWM in these communities in the North. Theoretically, this distinguishes the pattern of collective activity in local communities in Northern Thailand from the proposition of the loosely-structured society model of Thai social system as suggested by Embree (1950). Instead, the moral economy model of peasant collective behavior (Scott, 1976) seems to be more appropriate to explain the cooperative activities in the North, especially in the pre-modern village community. Findings of this study confirm the reciprocal activities in social groups of Chiang Mai village studied by Potter (1976), and demonstrate the peasant choice and priority setting found in Ban Ping by Moerman (1968). However, the patterns of collective action should not be analyzed as a static form, but rather as a dynamic interaction varying with other factors and pace of change in the community. The size of the community and number of users, also have an important influence on the practicability of reciprocal arrangements, as seen in the case of Ban Pae in comparison with Ban Luang. This implication was also found in the case of Bung

Khiew by Hirsch (1990b).

8.2 Outcomes and Consequences of Watershed Use

Under Community-Based Watershed Management

This section focuses on the outcomes and consequences of the use of watershed resources resulting from the patterns of interaction discussed in the previous section. However, the outcomes and consequences of watershed resource use can be directly affected or constrained by the physical and technical attributes of the watershed as discussed in Chapter 5. In theory, the common-property regime ensures sustainable use and conservation, equitable access to the resource, and livelihood security in the local community (Berkes, 1989). Therefore the concepts of: efficiency; equity; and sustainable livelihood are used as the evaluative criteria.

In practice, the application of these evaluative criteria necessarily involves value judgements. Evaluation of these criteria are based on two sources. The first is from the investigator's observations during the field work period. The second is based on the resource user's perspectives obtained by interviews and conversations about their satisfaction toward the outcomes of the use of watershed resources in their community setting.

8.2.1 Efficiency of Watershed Resource Use

This study evaluates the optimal use of watershed resources on the basis of the satisfactions of the users on the outcomes they receive from the watershed under the common property regime. Agreement with the rate of use of watershed resources includes both individual uses and communal uses. In a local community which is dominated by reciprocity, the members of the community weigh their choice of resource use beyond their self-interest benefit in the short term, and consider long-term benefit for the whole community. In the same manner, the villagers assess their satisfaction based on the collective outcomes for the whole community, in addition to their individual gains. Under the governance of CBWM they may not get everything they want from the watershed but they are assured of obtaining the resource that they need most for their livelihood. Despite that they have to sacrifice their self-interest, most of the local people still choose to cooperate rather than defect or free ride. In other words, overall they are satisfied with the rate of use of watershed resources under the present circumstances.

In Ban Luang, the villagers are satisfied with the resource use under the existing system of CBWM because they gain some privileges in using their rich watershed forest whereas the outside community are kept away. The CBWM provides them immunity from state intervention and influential entrepreneurs. Since the operational rules in Ban Luang are somewhat flexible in the appropriation of watershed forest for household needs, the villagers are not highly restrained from

what they enjoyed before. The green forest coverage in Ban Luang watershed area is very noticeable when compared with denuded forest areas of nearby Muang district. Most of the people of Ban Luang are proud of this observable success.

The people of Silalaeng have to employ maximum restraint in using their watershed resources. However, in the last 25 years, they have seen the replenishment of forest in the former shifting cultivation areas, and they still have the opportunity to appropriate some old growth forest. Moreover, the regular flow of water is even more rewarding for them. Considering the reputation which the community as a whole has received, the people of Silalaeng are satisfied with the outcomes of resource use under the CBWM.

In Thung Khao Hang, it is probably too early for the villagers to capture substantial outcomes from their designated watershed forest. Nonetheless, when asked about their satisfaction on the use of the forest, the villagers were satisfied, especially with the water for their household consumption. It was observed from the interviews and their expressions that their satisfaction was not evaluated from the short-term benefit for their generation but rather from the prospective long-term benefit for the next generation and the livelihood security of the community.

In the case of Ban Pae, apart from the direct benefits of the watershed forest, the villagers are proud of the reputation of their success, praised by government agencies and NGOs alike. Satisfaction about watershed use in Ban Pae is concentrated on the flow of water from the spring which supplies their rice fields and can be diverted to the village during the dry season. The other types of resource use

are of lower priority for they can be substituted from outside the community.

Overall, 98 percent of the respondents are satisfied with efficiency of resource use regarding the benefits obtained individually as well as the welfare of the community as a whole. There are only 2 percent dissatisfied with the rate of return obtaining from the restraint in resource use under CBWM (Table 8.9).

Table 8.9 Respondents' satisfaction on efficiency of resource use in each community

Satisfaction in efficiency	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	3.8	-	1.5	2.1	2.0
yes	96.2	100.0	98.5	97.9	98.0
Total	100.0	100.0	100.0	100.0	100.0

The group of people who are dissatisfied with the rate of return under CBWM are the losers when the local institutions are in effect. They could be the timber traders or the poorest of the poor who depend heavily on extraction of forest products and practicing shifting cultivation. The number of people (6 cases) involved may look meagre and may not be able to threaten the watershed and the community as a whole. Nevertheless, their existence indicates the possibility of institutional instability were this group of people to increase in the community.

There is nothing unusual in these high satisfaction levels because it is the main purpose for the common property regime. The interesting point is, however, the way the villagers evaluate their satisfaction on efficiency of resource use. These can be verified by the following propositions. First, according to Scott's (1976) moral

economy approach, the peasant's satisfaction on the economic return is based on the "subsistence ethic". This means that even if the current benefits of the CBWM are not yet substantiated, they may still consider it efficient if they are assured of long-term security. Second, it is perhaps correct to conclude, according to Popkin (1981), that the villagers seek to achieve maximum livelihood security, not maximum profit, in their economic behavior. The villagers therefore tend to maintain reciprocal relationships with their fellows, and consider the satisfaction on economic returns of the resource use on the basis of sustainable livelihood rather than short-term benefit.

8.2.2 Equity in Resource Use

To evaluate equity, this study, in the same manner as the evaluation of efficiency, used the satisfaction of users regarding their fair share and equal access to watershed resources. Overall, the satisfaction on equity in resource uses, though as high as 88 percent (Table 8.10), is lower than that of efficiency. The difference in the percentage of satisfaction of equity among the four communities is statistically significant ($\chi^2 = 53.16, P < 0.001$).

Table 8.10 Respondents' satisfaction on the equity of resource use in each community

Satisfaction on equity	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	30.2	1.2	3.0	2.1	11.8
yes	69.8	98.8	97.0	97.9	88.2
Total	100.0	100.0	100.0	100.0	100.0

Ban Luang has the lowest percentage (69.8 %) of satisfaction in equity of resource use among the four communities. This may result from the loosely enforced rules and irregularity of monitoring in the different Tambon. Complaints about the rich gaining more benefits from the watershed resources were reported during the field survey. Some of the Khamnan and village headmen are accused of having vested interests in logging and timber trading. These unequal uses of the resources, if allowed to persist, will eventually undermine local institutions in CBWM. The villagers will exercise restrained use of the watershed resources when they are assured that others will do likewise.

Silalaeng, unlike Ban Luang, has a solidarity in its decision-making arrangements that creates the same standard of enforcement for every member of the community. Each member of the community feels that he is assured of not being taken advantages of, and gaining equal access to the watershed resources in the same way as the others. The rich, who used to have their interests in timber trading, were forced to change to legitimate business, as mentioned earlier. The equal treatment in Silalaeng, when compared to Ban Luang, has encouraged the villagers to comply with the operational rules. Moreover, honest leaders, who never abuse their authority, have largely contributed to equity in Silalaeng.

Thung Khao Hang and Ban Pae also have a high percentage of satisfaction of equity in resource uses under the present resource regime. In such small communities, it is easier to monitor the behavior of each other. The villagers are able to express their concerns in the village meetings so that any sign of inequity can be

fixed relatively quickly.

The group of individuals least satisfied with equity in resource use under the present resource management regime are likely to belong to the group of defectors (V.41) and opportunists (V.42). These patterns of association are statistically significant ($\chi^2 = 8.10$, $P < 0.01$ and $\chi^2 = 4.70$, $P < 0.05$, respectively, Table 8.11).

Table 8.11 Association between satisfaction on equity (V.61) and cooperation (V.41), and opportunism (V.42)

Satisfaction in equity	Cooperation		Opportunism	
	no	yes	no	yes
no	50.0	10.7	10.2	25.0
yes	50.0	89.3	89.8	75.0
Total	100.0	100.0	100.0	100.0

These people are only a small portion of the community members when compared with the majority who cooperate with the rules and are obligated to reciprocity in collective actions, nonetheless, they reflect a significant relationship between the pattern of behavior of the users and the outcomes of resource use which one can anticipate in a given community.

8.2.3 Sustainable Livelihood

The sustainable livelihoods of community members were evaluated from their perspective of livelihood security regarding the existing CBWM regime. Overall, over

95 percent of respondents (Table 8.12) were satisfied with the prospective livelihood security resulting from the present management regime of watershed resources.

Table 8.12 Percentage of satisfaction on sustainable livelihood by community

Satisfaction on sustainable livelihood	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	8.5	-	3.0	4.2	4.2
yes	91.5	100.0	97.0	95.8	95.8
Total	100.0	100.0	100.0	100.0	100.0

As mentioned earlier, the majority of community members are rice farmers whose livelihoods are dependent on the water resource from the watershed forest so that they consider the protection of the headwaters as the first priority of resource use in the CBWM. As long as this purpose has been served their livelihood will be secure. Since the present watershed management regime was established for such a purpose, it is not surprising that a high percentage of respondents are satisfied.

When the four communities are compared, Ban Luang has a lower percentage of satisfaction than the others. Association between the different community and the satisfaction on sustainable livelihood is statistically significant ($\chi^2 = 8.75$, $P < 0.05$, Table 8.12). This is related to the high incidence of opportunism and inequity in Ban Luang which may, in turn, create some concern about the livelihood security in some groups of people who are taken advantages of.

In summary, it is important to note that individual satisfactions on the

outcomes and consequences of the use of the commons in the peasant community is not evaluated solely from individual gain over the short-term but rather from the benefit of the whole community and for their children. Unlike the user's satisfaction in the free market economy, the individuals in the peasant community measure their satisfaction on the principle of reciprocity and assured subsistence (Scott, 1976). This reflects the way the villagers think, which is called by Chambers (1988) as "sustainable livelihood thinking".

8.3 Livelihood Changes and Prospects for Community-Based Watershed Management

Thai society in general has changed rapidly in the past few decades. This pace of change, never before affecting rural life, is now penetrating into the lifestyle of the villagers in the rural community. The dynamics of rural Thai society are in one way or another summed up as a result of the incorporation of the local community into the wider social fabric. This process of incorporation has been driven by two main forces intertwined together (Hirsch, 1993). The first is the state-planned rural development programs such as improvement of major infrastructure, i.e., roads, electricity, irrigation, school, communications; and the expansion of state authority into the village polity. The second is the penetration of the market economy into the village economy. Today, there are virtually no communities in Thailand untouched by these two prime movers.

The patterns of changes can be articulated in several forms: change in production from subsistence to market orientation; change in consumption from meeting basic needs to accumulation of wealth and consumerism; change in occupation from the agricultural to non-agricultural sectors; change in control of resources from traditional community-based control to either state control or private ownership; change in pattern of behavior from reciprocity to competition; change from self-reliance to dependence on external inputs; and so on. These agrarian changes in peasant society have been the subject of debate known as "differentiation" by theorists such as Lenin (1982) and Chayanov (1966). In the context of rural Thai society, agrarian differentiation has been scrutinized in the North by Turton (1975; 1987; 1989), Ganjanapan (1984; 1989), and Dearden (1993), in the northwest of Central Thailand by Hirsch (1990b), and in the North and Northeast by Shigetomi (1992). In most cases, incorporation and differentiation usually go hand in hand (Hirsch, 1990b). These serial and simultaneous changes affect existing CBWM and the livelihood security of the rural communities overall.

With the advent of the market economy in the village community, the natural resources surrounding the villages have become scarce through overexploitation, thereby reducing the chance of newly-established households to acquire new farmlands. At the same time, villagers have been forced to earn cash income as they become increasingly involved in market transactions. This new socio-economic environment has brought about new forms of cooperation held together by rules and principles that are different from those dyadic relationships that created the

traditional cooperation (Shigetomi, 1992). The new system of cooperative labor exchange, unlike the traditional system, is reached collectively by rules of conduct. It is not a dyadic interaction, but rather a clear and well-defined membership. The provision of labor no longer depends only on the willingness of people to voluntarily cooperate, but it is set according to rules agreed upon by the group.

The impact of the market economy has greatly changed the state of watershed resources. The expansion of upland cultivation for cash crops has destroyed the forests in the headwaters areas. Logging for timber trading in pursuit of private gain and economic surplus also accelerates the disappearance of the watershed forest. Upstream cultivation has caused soil erosion and sedimentation in water channels as well as chemical residuals (Roddan, 1993). These impacts have threatened the stability of lowland agriculture and the sustainable livelihood of the people (Faichampa, 1990).

The important stage of change is the institutionalization of the management process to assure a fair distribution of communal resources. Under new circumstances, the dyadic relationships of kinship and friendship must not distort the management process for distributing the shares and other benefits. The same rights and duties must be applicable to everyone which means that the community rules have to take priority over dyadic relationships and patron-client system (Shigetomi, 1992). In the market economy, such institutionalization of the resource management regime is necessary because the villagers have become more self-interested which makes it unacceptable to allow only a certain number of the villagers to benefit from

the use of commons at the expense of the others.

Institutionalization of the village's communal resource management requires rules providing for the control of uses and the punishment of offenders. However, these local rules are not legalized by national legislation or government authority, nor can the actions or behavior of the resource users be regulated through rules and contracts in every aspect. Therefore, in practice, the success of these new forms of cooperative activities and CBWM still relies largely on the traditional dyadic reciprocity and moral obligation of the villagers to cooperate together.

Perhaps at this point, the critical issues are how to maintain the cooperation and reciprocity among the villagers; how to assure the members of the community that nobody will choose the free-rider strategy; and what kind of mechanisms are needed to make the local institutions effective in the future.

The above changes occur all over rural society in Thailand. The impacts on rural life, however, may vary in different communities depending on the concentration of the market forces and governmental development programs, the remoteness of the communities, and resistance to change in the communities. This study has attempted to examine the trend of livelihood changes of the four selected communities from the point of view of the community members themselves. This in turn implicates the viability of the CBWM in the future.

8.3.1 Trends of Change in Occupations

The perception of the heads of household towards change in agriculture-based occupation for the next generation was assessed in the household survey. Sixty percent still foresee their children in agriculture-based occupations, 30 percent think that their children are likely to enter a non-agricultural career, and 9 percent anticipate that their children will leave for the city to pursue the well-paid jobs and may never come back to their village (Table 8.13).

Table 8.13 Percentage of trends in career change in the young generation

Prospective change	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
remain agriculture	71.7	58.1	54.5	45.8	60.1
change to non-agri.	21.7	24.4	37.9	47.9	30.1
move to town jobs	6.6	17.5	7.6	6.3	9.8
Total	100.0	100.0	100.0	100.0	100.0

The limited lowlands and scarce unclaimed forest lands make it difficult for the new generation to acquire their own plot of land, or even to rent one. In addition, the availability of more schools provides opportunities for the new generation to pursue higher education which in turn opens a more diverse career path than agriculture. At the same time, growth in the manufacturing and service sectors has provided more job opportunities in the urban areas. These factors

combined together force the change in economic base from agriculture to a more diversified non-agricultural base. Ban Pae has a higher percentage of change in occupation than the other three communities because the location of the village is close to the manufacturing center and big city, Chiang Mai. Moreover, the villagers can commute daily to the workplace. For the other three communities, the villagers pursuing non-agricultural occupations may have to leave for the big cities.

8.3.2 Dependency on the Outside Community

The livelihood of a village may change to become more dependent on the outside community as the village becomes incorporated into the larger market economy of regional and national system. It was found that more than 80 percent of respondents believe that the local community has become more dependent upon market centers that are beyond local control. Less than 20 percent still believe that their local community is capable of being self-reliant in the sense that it can produce the basic necessities (food, clothes, shelter, medicine) from local resources with minimal dependency on the outside.

The percentage of dependency is relatively high in Thung Khao Hang, Ban Pae, and Silalaeng (Table 8.14), perhaps because these locations are more easily accessible to the market places in the city than that of Ban Luang. Some areas of Ban Luang are still isolated from the major market centers. Perceived dependency of livelihood of the local community on outside society is significantly different

between communities ($\chi^2 = 31.11$, $P < 0.001$).

Table 8.14 Perceived dependency of each community on outside society

Dependency	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
dependence	64.2	82.6	93.9	93.8	80.4
self-reliance	35.8	17.4	6.1	6.3	19.6
Total	100.0	100.0	100.0	100.0	100.0

8.3.3 The Culprits of Watershed Degradation

Opinion about who should be blamed most in causing watershed degradation in Northern Thailand shows that influential people and entrepreneurs are most responsible followed by hilltribes and other villagers (Table 8.15). Ban Luang has a strong hostility toward entrepreneurs (*Nai Tun*) resulting from its experience with the sawmill company. Silalaeng expresses high concern about the hilltribes, especially the H'tin who reside in the headwaters and occasionally intrude across the boundaries of the protected watershed forest. Thung Khao Hang, apart from the influential people, gives the highest percent among the four communities to government officials for contributing to the degradation of the forest. The reason is probably because the forestry officials in the detachment near the village have often abused their authority and been involved in illegal logging, while expressing an indifferent attitude toward the CBWM of the village. Meanwhile Ban Pae seems to have harsh feelings against

fellow lowland villagers in addition to influential people regarding the disappearing watershed forests.

Table 8.15 The group of people most responsible for watershed degradation from the villagers' point of view, by community

Groups of people	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
lowlanders	14.8	20.8	21.9	39.1	21.9
entrepreneurs	63.4	32.5	40.6	43.5	46.9
hilltribes	18.8	44.1	17.2	2.2	22.6
officials	3.0	1.3	20.3	15.2	8.3
others	-	1.3	-	-	0.3
Total	100.0	100.0	100.0	100.0	100.0

These opinions suggest that the villagers do not look at themselves as culprits who cause the disappearance of the watershed forest but rather consider themselves as guardians of the forest. In contrast, the traditional view of the forestry officials toward the villagers is that they are a threat to the forests. Neither of these two points of view, however, can be taken as a blanket explanation for watershed degradation in Northern Thailand. Although there have been many communities initiating locally-managed forest areas (Social Research Institute, 1991), only some of them are successful in developing local institutions to govern the use of the forests as the commons. Furthermore, not every village community in the North is capable of forming a community-based watershed management.

Ali existing community-based watershed management institutions have passed through the time-tested process of institutionalization. Nevertheless, these local institutions are still evolving in relation to changes within local communities. Their sustainability is dependent on several factors discussed earlier and their resilience in the changing economy and polity of the local community.

8.3.4 Control of Local Resources

The control of local resources may not become an issue if the resource regime is interpreted as stated in the law, i.e., state property regime. In practice, the effective presence of state authority in many localities did not exist until recently. Meanwhile, the influences of the market economy were limited to some major communities. Local villagers have thus taken control of resource use for decades, and established local institutions to manage watershed resources as common property resources. However, as the forest resources become more scarce the local communities are losing control of resources to the state in the form of national reserve forests, national parks, and other designations (Hirsch, 1990b). At the same time, the penetration of the market economy into the local community has decimated local control of resources in the form of commercialization of watershed resources and marginalization of local people.

More than 90 percent of respondents in Ban Luang and Silalaeng feel that they are losing control over the local watershed resources. Meanwhile more than 58

percent of respondents in Ban Pae feel that they are gaining more control of local watershed resources (Table 8.16).

Table 8.16 Perceived change in control of local watershed resources in communities over time

Local control of watershed	Ban Luang	Sila-læng	Thung Khao Hang	Ban Pae	Total
increase	2.8	9.3	53.0	58.3	24.2
no change	1.9	-	3.0	10.4	2.9
decline	95.3	90.7	43.9	31.3	72.9
Total	100.0	100.0	100.0	100.0	100.0

These differences can perhaps be explained by the variation in stages of institutional evolution prevailing in each community. Ban Pae may be in the period that the local community begins to regain complete control over the watershed forest after passing through the process of institutionalization and government recognition. In the meantime, Ban Luang and Silalaeng are in the middle stage of their institutional resilience under the pressing penetration of the state and the market. The different phases in the control of local resources are significantly associated with the different communities ($\chi^2 = 115.82$, $P < 0.001$, Table 8.16).

8.3.5 Government Involvement

In the past, these communities were considered as the frontier and out of

reach of state authority. The local communities had *de facto* autonomy to create their own rules to keep the members in peace and order. Minor conflicts were solved internally through negotiation, compromise, and graduated sanctions. The state rarely asserted its authority to interfere with the self-controlled management of local watershed resources as long as there was no threat to national security.

The state, however, has now increased its presence in each locality in the form of rural development programs especially under the supervision of the four major ministries - Interior, Education, Public Health, and Agriculture and Cooperative. The presence of the state apparatus does not necessarily interfere with the local institution in every case. However, the state-planned development programs emphasizing popular participation implicitly aim to control the people rather than to devolve power from the government to the local people.

More than 80 percent of respondents in Ban Luang, Thung Khao Hang, and Ban Pae and 64 percent in Silalaeng feel that government involvement in the community watersheds has been increasing (Table 8.17). However, the villagers do not absolutely oppose the presence of the government officials in the community as long as they do not abuse their power. Instead these communities want the government to engage in a constructive role that can enhance the strength of local institutions. At present, the capability of local institutions to handle the increasing pressure from the external forces is being challenged considerably. The local institutions alone may not be able to overcome some of the conflicts in resource use. The state authority can help legitimize the local institutions in dealing with powerful

threats from outside the community.

Table 8.17 Trend of government involvement in community-based watershed management

Government involvement	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
increasing	88.7	63.9	81.8	87.5	80.0
no change	6.6	14.0	1.5	10.4	8.2
declining	4.7	22.1	16.7	2.1	11.8
Total	100.0	100.0	100.0	100.0	100.0

This situation has opened up the feasibility of co-management strategies in watershed management which involve real power sharing between local communities and government agencies with jurisdiction over the resources, so that each can check and balance the potential excess of the other. This strategy has been initiated in forest management in British Columbia between the native people and the provincial government (Pinkerton, 1993), and in other regions in Canada (Gardner and Roseland, 1989).

8.3.6 Threats From Outside Influential People

In general, local communities are no longer remote from the influence of the fast-growing market economy of the cores. The temptation of the high standard of living in the market centers has sometimes raised the expectation of individual villagers to a point beyond the sustainable use of local resources. This situation may

stimulate attempts to exploit watershed resources by outside entrepreneurs (*Nai Tun*) seeking cooperation from free-riders inside the community.

In contrast to the general situation mentioned above, the majority of respondents in Silalaeng, Thung Khao Hang, and Ban Pae firmly indicate that attempts to exploit watershed resources by outside entrepreneurs has declined since the local institutions of CBWM came into effect. This shows that local institutions are, to some degree, effective in protecting the watershed resources. Ban Luang, however, is exceptional; more than 42 percent of respondents still think that the threat from influential people to their watershed forest has increased (Table 8.18). This perceived change in threat from influential people is significantly associated with the different communities ($\chi^2 = 63.95$, $P < 0.001$).

Table 8.18 Trend of threat from influential people to community-based watershed management

Threat from influential people	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
increasing	42.5	7.0	9.1	4.2	19.3
no change	6.6	4.7	10.6	18.8	8.8
declining	50.9	88.4	80.3	77.1	71.9
Total	100.0	100.0	100.0	100.0	100.0

8.3.7 Land Sale

One of several factors that might have a profound effect on community-based watershed management is the increasing rate of land sales in many areas of Northern Thailand. This has resulted from the rapidly growing investment in the region causing the values of land to increase. At the same time, the growing middle-class population are increasing demands in the recreational and service sectors such as for resorts and golf courses. Lands in pristine and ecologically vulnerable areas may become valuable assets. Many villagers sell their lands when offered good prices. These newly-landless people, if absorbed into the non-agricultural sectors will do no harm to the watershed forests; however if this is not possible, some of them may further encroach on forest lands to replace the sold lands. This latter groups are a threat to the watershed forests and initiate a vicious circle of environmental degradation, poverty, migration, and further deforestation (Hirsch, 1990b).

Fortunately, in all the communities being studied, except Ban Pae, more than 90 percent of respondents have not sold their lands (Table 8.19). Ban Pae has 20.8 percent of respondents having sold their lands, however, most of them do not intend to acquire new farmlands but rather enter the employment market in the city. In Thung Khao Hang none of the respondents have ever sold their land because the community is remote from the prosperous land market. The percentage of land selling differs significantly according to the community ($\chi^2 = 21.32$, $P < 0.001$).

Table 8.19 Percentage of households selling their land, by community

Land selling	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	95.3	94.2	100.0	79.2	93.5
yes	4.7	5.8	-	20.8	6.5
Total	100.0	100.0	100.0	100.0	100.0

8.3.8 Seeking New Farmlands

Some people are still seeking new cultivated lands by clearing forest lands if the opportunity arises. They may be the same group of people who have just sold their land as discussed above but have not yet been absorbed into the employment market (TDRI, 1990). Yet in the current situation, there is little unclaimed land because the frontiers are mostly occupied or otherwise closed.

The household survey revealed that almost 30 percent of respondents in Ban Luang and Silalaeng are still seeking cultivated lands from the forest (Table 8.20). In Thung Khao Hang, more than 40 percent of respondents are still looking for new farmlands. Ban Pae has only 8.3 percent of respondents seeking new farmlands. The percentage of respondents seeking new farmland is significantly associated with community ($\chi^2 = 14.63$, $P < 0.01$).

Table 8.20 Percentage of households still seeking new cultivated lands from the forest, by community

Seeking new farmlands	Ban Luang	Sila-laeng	Thung Khao Hang	Ban Pae	Total
no	70.8	70.9	59.1	91.7	71.6
yes	29.2	29.1	40.9	8.3	28.4
Total	100.0	100.0	100.0	100.0	100.0

In all the communities, these groups of people, however, concede that opportunities for new land are becoming fewer, if any at all. Therefore, they tend to opt for other means of living rather than land-bound occupations. The opportunities for new farmlands as well as the opportunities for nonland-bound occupations may also vary from community to community.

In summary, the expansion of state authority into the village community has assisted the market economy to penetrate into the countryside. The state-planned development strategy advocating popular participation was implicitly an instrument for the state to channel its authority to the locality and incorporate the local community into the wider system of governance. The penetration of the market economy into the village community has gradually changed the traditional reciprocity into new forms of cooperative activities. The pattern of change in cooperative activities has been articulated in several forms as described by Shigetomi (1992): First, cooperation based simply on "obligatory voluntaryism" may not be enough to coerce cooperative actions from the villagers, but rather collectively-decided rules are needed. Second, many of the traditional cooperative activities organized on dyadic

relationships are being transformed into cooperative activities organized collectively by rules. Third, the rules, membership, and the penalty for rule violation must be clearly and well defined and remain in effect.

Village communities of the North have acquired a new role as a "territorial organization" possessing common property resources necessary for sustainable livelihood of the community which, in turn, need to be managed collectively. Nonetheless, despite the introduction of the new forms of cooperative activities reinforced by collectively organized rules, the successful operation and satisfactory outcomes of community-based watershed management must still depend on the moral commitment of the individual villagers to respect the collectively-made operational rules. Yet, moral norms alone do not overcome the problems of free riders. Above all, the magnitude of change and its effects are determined by a specific locality and its historical environments. This means that whether the villagers act morally (collectively) or rationally (individualistically) depends on the different localities and specific factors involved (Feeny, 1983; Hirsch, 1990b).

Notes

1. Embree's (1950) "loosely-structured society" model of Thai society contains three particular features which are fundamental in binding the individual relationships: First, all relationships are basically dyadic relationship, even when groups are formed. Second, a good human relationship with a fellow villager is more important than formal social relationships in assuring a desired action from a villager. Third, an organized group activity has no precise or continuous membership. In this society, highly individualistic behavior is expected and tolerated; traditional norms of conformity and cooperation do not serve to reduce the cost of organizing local collective action (Feeny, 1988a).

2. Chiang Mai village is a pseudonym of a village community in Saraphi district, about one-hour drive from the city of Chiang Mai.

3. For more detailed discussions about "moral peasant" and "rational peasant" see Brocheux, 1983; Feeny, 1983; Keyes, 1983a.

4. Keyes (1983b: p.865) states that "the Buddhist villagers in northeastern Thailand have a distinctive economic ethic and, thus, a distinctive moral economy not because they are peasants, but because they are Buddhists who are also peasants." In Northern Thailand, Buddhist monks have historically been involved as a spiritual leader of the community toward infringement from external forces such as the case of Kruba Srivichai, the highly-respected monk of Lanna during the early period of incorporation into the Siamese State (Vaddhanaphuti, 1984). Currently, there have been increasing incidents of Buddhist monks leading the local communities to save watershed forests from logging and shifting cultivation (Lohmann, 1991). For example, Phra Ajarn Pongsak Tejadhammo led lowland farmers to rally against shifting cultivation by the hilltribes in the upstream watershed in Mae Soi, Chiang Mai (*Far Eastern Economic Review*, 13 December 1990: 35-37). In Nan, Phra Palad Sanguan Jaruwanno used an unorthodox strategy to save the forest by ordination of the trees in his hometown of Santisuk branch district. He conceded that this was not the right conduct of using Buddhism for nature conservation, but it worked effectively (Phra Palad Sanguan Jaruwanno, 1992, personal communication). Some Buddhist scholars also attempt to link the interdependency of all things in nature and ecological niche to the essence of *Dharma*.

Chapter 9

Conclusions and Recommendations

The confusion of common property resources with open access leads to the uncritical acceptance of the scenario of the "tragedy of the commons" which influences polarization of management policies into two paths - state intervention on the one hand and privatization on the other. Both policies lead to destruction of locally-managed resource regimes.

The purpose of this study was to help understand how local communities involved in community-based watershed management (CBWM) in Northern Thailand managed to solve the problems of the commons. The four selected communities represent different situations, and manifest common factors, under which CBWM has emerged over different time periods. A comprehensive analysis of the local institutions was conducted by using an analytical framework modified from Oakerson's conceptual framework for analyzing the commons (Oakerson, 1992). This conclusion will bring together some of the more important findings, first about each community and then at a more generic level before finishing with some recommendations.

9.1 Managing the Commons: The Village Perspective

Ban Luang. Ban Luang's community-based watershed management emerged from a revolt of the peasants against infringement of traditionally-protected headwaters by an entrepreneur and the state. The large watershed area and large number of users create some difficulties for exclusion and monitoring. This contributes to free riding and opportunistic problems which, in turn, lead to inequity in resource use. The relatively rich watershed forests of Ban Luang have helped absorb subtractive use within the community but, at the same time, attract outsiders to exploit the resources.

Institutional arrangements in Ban Luang are somewhat loosely organized regarding the appropriation rules and enforcement mechanisms which are fragmented amongst different Tambon. The right of the villagers to cut trees for building houses is little regulated which sometimes creates conflict with *de jure* rights defined by laws and used by government officials. The traditional water user groups and the leaders are the most important informal network that sustain coordination and cooperation in Ban Luang's CBWM today. The reputation of Ban Luang's CBWM initiative in the early period has helped gain nationwide recognition. At present, the institutional performance of Ban Luang's CBWM is, however, assessed as a fragile institution. The incidents of rule defiance, opportunism, and free riding and dissatisfaction in equity in resource use reflect unstable situations. In such a situation, if no immediate improvement in institutional and organizational arrangements occur, it may lead to

a failure of CBWM in the long run.

Silalaeng. Silalaeng developed community-based watershed management on the initiative of charismatic leaders. Silalaeng is a typical lowland community which relies heavily on water sources from an upper watershed occupied by highland minorities practicing shifting cultivation. The Tambon Council instituted the rules prohibiting further encroachment of the forests and controlling the rate of appropriation of watershed resources. The intermediate size of the watershed, relatively few users, moderate scarcity of the resources, and the close proximity of the watershed forest to the community, contribute to some degree of excludability. The degree of subtractability is checked by the operational rules which clearly define the rights and duties of users. The boundaries of the watershed are clearly delineated and agreed upon by concerned parties.

Silalaeng has successfully used the Tambon Council as an organization for decision making and enforcing the operational rules. Continuous monitoring - the forest patrol - has reinforced cooperation and reciprocity among the users from different villages. The institutional performance of Silalaeng's community-based watershed management is thus assessed as robust and meets all the design principles for a long enduring institution. This is also reflected in the villagers' acceptance of the rules and high satisfaction about the outcomes of resource use. Silalaeng has also been successful in maintaining a good relationship with the government agencies and local officials. Silalaeng's CBWM initiative is highly recognized by all levels of government and major NGOs.

Thung Khao Hang. Thung Khao Hang is situated in a drought prone area where water shortage is occasionally experienced by the villagers. The designated watershed forest has been preserved for a source of water for rice cultivation and domestic use, especially in summer. The medium sized and relatively scarce watershed forest contributes to a high degree of subtractability within the designated watershed forest. The villagers substitute their needs for watershed resources other than water from the surrounding forest outside the protected area. The designated watershed forest may be closed occasionally from appropriation to allow replenishment of the natural resources.

Thung Khao Hang has adapted the village laws (*Khodmai Muban*) traditionally used for social control in the village to regulate the use of watershed resources. The village committee is the decision-making arena and mechanism for rule enforcement. The small number of users makes it easier to monitor the behaviour of each other. However, unclearly-defined boundaries and the distant proximity of the watershed forest from the village cause some difficulties in the exclusion of outsiders. Thung Khao Hang's CBWM initiative is less known to the public, and recognition of the right to manage the watershed forest is limited to the local administration. Institutional development is still in a very beginning period. Overall, the institutional stability of Thung Khao Hang's CBWM is fragile.

Ban Pae. The villagers of Ban Pae have harmonized their way of life with the watershed forest since the beginning of the settlement. The villagers, dominated by rice farmers (water user groups), have preserved the nearby forest where spring water

originates and the spirit of the headwater is believed to live. They have depended upon this watershed forest for their livelihood ever since.

With a small area and limited resource endowment the degree of subtractability in the watershed system is very high. The villagers have to exercise maximum restraint in the use of other resources to keep the forest for water maintenances. The small size of the watershed and small number of users with clearly-defined boundaries and membership turn Ban Pae into a total territorial organization. The village committee has taken responsibility for every activity concerning the welfare of the community as a whole. The operational rules of CBWM have been reinforced with the norms, beliefs, and dyadic relationships within the village. Ban Pae's CBWM institution is, therefore, robust and stable. Despite agrarian changes occurring in the village resulting in convinced dependence on external resources, the CBWM institution is still needed as long as the villagers consider a source of water indispensable for their livelihood. Although the villagers have become more engaged in off-farm employment they still grow rice for food security.

9.2 Managing the Commons: Thematic Considerations

During the course of this study several more generic themes have emerged that are worth of further mention. By nature, watershed resources are subject to joint use with a varying degree of subtractability. It is also very difficult to exclude

individual users but some degree of excludability of users from outside the group is possible. Division among individual users is virtually impossible but some degree of divisibility of partitioning such as at the village community scale may be found. Since watershed resources are mostly renewable, the rate of use can be regulated by rules of conduct to not exceed the sustainable yields. A large watershed as well as distance from the community contribute to a low degree of excludability. Meanwhile scarcity of watershed resources tends to exacerbate the high degree of subtractability. All these physical attributes ascribed by nature and constrained by available technology, when combined, will enhance or otherwise constrain the patterns of use of the watershed resources. These are reflected in the rules invented to regulate the rate of use and behavior of the users to secure the sustainable livelihood of the community.

Socio-economic characteristics of the user community are affected by the physical attributes of the watersheds and available technology to make use of the resources. All socio-economic variables together influence the emergence of CBWM and its configuration rather than independently determine the formation of CBWM in the form of causal relationships. As Olson (1965) originally stated, and Ostrom (1986; 1990) and Feeny (1992) pointed out more recently, a small group of users is more likely to form collective actions in resource use because it is easier for the members to recognize each other, easier to detect any wrongdoing, less costly to monitor, and less costly in coordinating and decision making. It was found in this study that, if other things are equal, a small number of watershed users with a strong

social cohesion reinforced with traditions, norms, and operational rules, is more successful in establishing community-based watershed management.

In each community, the pattern of land use reflects occupation, income, land tenure and dependence on the watershed resources. The degree of dependence on watershed resources influences the emergence and the sustenance of CBWM to assure sustainable livelihood security of the community as a whole. The local communities with CBWM are characterized by having a majority of community members engaged in wet rice cultivation, which requires much water at specified periods of time. Under the constraint of the hilly landscape the communities of the North have, for a long time, had the *Muang Fai* system to manage water allocation and maintenance collectively. To assure the regular flow of water these communities usually preserve the forests in the headwater areas for their watershed value.

The limited area of lowland has forced landless farmers and farmers with small lowland holdings to pursue upland cultivation in the forest lands. Upland cropping became the safety valve of land pressure in lowland communities before it was prohibited by the rules of CBWM and it became less attractive because of low economic returns. Meanwhile alternative job opportunities in the local communities as well as in the cities have now become the safety valve for land pressure. Upland cropping has been transformed into fruit tree plantations with the expectation of promising long-term economic returns and the speculation of obtaining a land titlement in the future, which in turn adds value to the land.

The security of land tenure is closely related to the patterns of land use. It

seems to be typical in the North that the paddy fields in lowland valleys usually obtain secure land tenure whereas farmlands in the upland areas have less secure ownership certificates, if any at all. The orchard lands can have secure land tenure if they are in the lowland areas. The problems of land tenure mainly occur in the uplands because most of them are acquired by encroachment in the national reserve forest. The villagers want secure land titlement to accommodate legal transfers rather than to be secure from eviction.

This study revealed that years of schooling among younger generations in the local communities have steadily increased. This can be explained by several reasons, for example, changes in regulations designating the level of compulsory schooling, more high schools in these rural areas, the requirement for higher education in the workplace, and growing aspirations in using education as a path to escape poverty in the rural areas. Increased schooling may result in a change in occupations which in turn may decrease the degree of direct dependency on the watershed resources, and therefore can affect the sustenance of community-based watershed management.

Dependence on watershed resources is a crucial factor influencing the emergence and sustenance of CBWM institutions. The rice farmers whose livelihood security is dependent upon water from the watershed are the ones who consider headwater as an indispensable resource. They therefore assess the water resource as the first priority in CBWM while other resource sectors such as timber, fuelwood, cultivated uplands, and minor forest products can be compromised or substituted from external sources.

However, for the landless farmers, whose livelihoods are highly dependent on the upper watershed for cultivated lands and the extraction of other resources except water, the establishment of the CBWM is considered a threat to their livelihood security. This group of people are not just "poor" but rather the "very poor" (Chambers, 1988) who are desperately tempted to extract watershed resources for their day-to-day living. For villagers whose livelihoods are not directly dependent upon watershed resources, they may be interested in preserving the watershed forests for recreational and aesthetic values which are increasingly appreciated by the growing middle-class population.

Although the demands for watershed resources, such as timber, in the market are very high, the local communities will not trade their community watershed forests for short-term benefits, but rather collectively manage the watershed resources for their livelihood security, and for the future of their children. Conflicts in watershed resource uses within the community are usually resolved by setting priorities amongst different types of use.

Successful community-based watershed management is often associated with honest and charismatic leaders. These leaders are the representatives of the villagers in protecting the watershed resources for the common interest of the community and against infringement by the state and capitalists (Scott, 1976). However, in some cases, local leaders have become instruments of the state and entrepreneurs. In such situations, CBWM is unlikely to be initiated, or, if already established, likely to collapse in a short time because the leaders are dependent on the external resources

instead of sharing the common interest with the local villagers (Popkin, 1979; Hirsch, 1990b).

Decision-making arrangements including the institutions and organizations in CBWM are human inventions designed to alter the patterns of behavior of resource users in the use of watershed resources as the commons. The operational rules govern the day-to-day interactions in the use of resources to ensure that the watersheds are jointly used with equal access among eligible users with an overall rate of use that does not exceed the rate of replenishment. These rules vary from one community to another corresponding to the physical attributes of the given watershed and socio-economic characteristics of the particular user community.

Strong CBWM institutions are usually associated with: clearly-defined watershed boundaries and well-defined membership of the user community; continual monitoring; congruence between the rules and physical conditions of the watersheds and socio-economic characteristics of the community; graduated sanctions for different degrees of offences; available mechanisms for conflict resolution; public recognition of the rights to manage the watersheds; and no serious conflict between *de facto* rights assigned by operational rules and *de jure* rights defined by national legislation.

Originally, the organizational arrangements and decision makers in CBWM were formed from the water user groups, and then shifted to existing local organizations, such as the Tambon Council, and Village Committee. These local organizations are actually in the same channel as the state authority in the local

community (local administration) which, in turn, enables CBWM to gain recognition from the government and benefit from rural development funds. Furthermore, the villagers tend to increasingly favour sanction by law enforcement for violation of the operational rules. This is to avoid inequity resulting from the patronage system in the community.

The operational rules are operated under the collective-choice rules which, in this study, are the government policies and administrative guidelines for the government officials concerning the recognition of CBWM. The government policy on CBWM at present is no more than lip service. The policies on watershed management in the North have, for a long time, been preoccupied with national security problems concerning the highlanders. Lowland-based watershed management by the local communities receives little aid from the government.

Ultimately, both operational rules and collective-choice rules function within the legal framework of constitutional rules, the laws defining jurisdiction over the watersheds. Modification of this level of rules is often resisted by the status quo and bureaucracy. Although the villagers acknowledge the state property rights on the watershed forest they usually treat the forests outside their communal watersheds as open access - "the state property is everybody's property".

Patterns of behaviour of resource users in peasant communities have been the topic of theoretical debate whether it is moral (Scott, 1976) or rational (Popkin, 1979), collective or individualistic (Feeny, 1983; Hirsch, 1990b). This study suggests that in the pre-modern peasant communities of Northern Thailand the closed

corporate villages did exist with norms and an ethic of reciprocity to ensure the security of subsistence. Today this characteristic can still be seen in many parts of rural life. The "safety-first" principle was employed to minimize the risk to which the community members were exposed.

The subsistence ethic was the foundation for collective actions underlying the formation of community-based watershed management. With this moral economy, the villagers made their decisions based on the common interests of the whole community and the long-term benefits for the future generations. Therefore they chose to cooperate with the norms and rules of conduct rather than to free ride for their self-interests. Collective actions were found in the various kinds of cooperative activities in the local communities in the North, including reciprocal labour exchange, household ceremonies, and the rites of passage.

The definite territorial and social units of the village communities in the North also contributed to the high possibility of collective action. Nevertheless, opportunists and free riders always exist in the commons situation as well as in general society. The important task is thus to keep them to minimal proportions. This is why effective institutional arrangements and enforcement are so crucial in the management of common property resources.

In the same manner as they make decisions on the use of watershed resources, the peasants in these communities evaluate their satisfaction on the outcome of the use of watershed resources from the viewpoint of long-term benefits to the sustainable livelihood of the whole community and their children. Their way of

viewing the use of watershed resources is known as "sustainable livelihood thinking" (Chambers, 1988). The villagers did not solely evaluate their satisfaction from their personal benefits but also consider the well being of their fellow villagers.

Equity in the use of watershed resources is also critical for the sustenance of CBWM because individual users will restrain themselves in the use of watershed resources only if they are assured that the others will do the same. Unfair appropriations and provisions can easily trigger a surge of opportunistic and free riding behaviour which will erode reciprocity leading to the collapse of the common property regime.

The evolution of community-based watershed management can be conceptually represented in three stages (Table 9.1). In the first stage, the pre-modern period, CBWM emerges. During this period, the local community is self-contained and isolated as a corporate village. Socio-economic characteristics and interests of the villagers are convergent and relatively homogeneous. The villagers reciprocate their cooperative activities using the norms and traditions as the rules of conduct. The underlying theory in this stage is the moral economy approach (Scott, 1976).

The second stage, the modern period, is amidst nation state formation and the advent of the market economy. The village communities begin to be affected by outside society and dependent on external resources. Infringement on the communal resource management system by the state and capitalists brought about rebellious action, as seen in the case of Ban Luang. During this period, the village economy,

polity, and ecology were gradually incorporated into the larger system of regional and national level. As a result, local communities have gone through the process of differentiation and stratification where the interests and socio-economic

Table 9.1 The evolutionary stages of community-based watershed management in Northern Thailand

Attributes	Pre-modern	Modern	Post-modern
CBWM	emergence	evolving	institutionalization
Underlying theories	Moral Economy (Scott, 1976)	Political Economy (Popkin, 1979)	Incorporation into the state (Hirsch, 1990b) and Penetration of the market economy (Shigetomi, 1992)
Status of watershed resources	becoming scarce	scarce and deteriorate	highly scarce and limited
Local community	self-contained, corporate village, and isolated	become more dependent on outside the community	territorial organization, incorporated into larger system
Socio-economic attributes	convergence homogeneity cohesion	differentiating, stratifying	divergence heterogeneity pluralism
Pattern of behaviour	reciprocity cooperation interdependence	rational, maximum security, investment	self-interest competition, maximum profit
Institution	norms folklore traditions	collectively -organized rules	formal institutions, organizations

characteristics of the resource users diverge. In such a situation, individuals tend to act rationally and move away from moral obligation toward self-interested behaviour. The subsistence ethic in the village communities is challenged considerably. Collectively-organized rules and clearly defined membership of resource users are needed to regulate the use of watershed resources. Community-based watershed management has been established and strengthened through institutional arrangements and graduated sanctions. The underlying theory for this period is the political economy approach (Popkin, 1979).

In the third stage, the post-modern period, the local communities are fully incorporated into the larger society and the market economy has completely penetrated rural life. The village communities, at the same time, have been transformed into "territorial organizations." Socio-economic characteristics diversify and the interests of the villagers are divergent. The villagers are self-interested and compete with each other in economic activities. More activities are transacted via market mechanisms where money plays an important role. The collectively-organized rules and procedures are eventually institutionalized. The CBWM is transformed into a formal organization in the community responsible for managing watershed resources for economic productivity and welfare of the community. The underlying theories in this stage are the incorporation of the state (Hirsch, 1990b) and the penetration of the market economy (Shigetomi, 1992).

However, at this moment, local organizations such as the Tambon Council and Village Committee are not yet legal entities and the local institutions in community-

based watershed management have no legal basis. Thus cooperation and compliance in CBWM still ultimately rely upon traditional cooperative activities, dyadic relationships, and moral obligations among members of the community.

The evolutionary process is a continuous activity rather than a discrete change. Each community may not have clearcut attributes in each stage. These evolutionary stages should be envisaged as a heuristic model to understand the CBWM situation in the process of change, rather than a predictive model. Most CBWM institutions in the North are generally in the continuum of the second stage. Ban Luang and Silalaeng are probably in the second stage of institutional evolution. Thung Khao Hang is perhaps in the first stage and moving toward the second stage. Ban Pae is moving from the second to the third stage.

This study demonstrates that the use of watershed resources as a commons is not necessarily destined toward the scenario described by Hardin (1968) as the "tragedy of the commons". However, this study does not completely reject the possibility of the tragedy of the commons, but disagrees with its generality and bimodal solutions - the state and the market. This study indicates that there is another way to manage the common property resources, at the local community level. Local institutional arrangements have been effective in regulating the use of watershed resources and maintaining jointness as well as optimal rate of use. However, these findings, like the "tragedy of the commons", cannot be used to generalize to all local communities but specify the likely situations and factors that enable villagers to develop successful community-based watershed management.

Many local communities in the North, including the four communities in this study, have shown the potential to manage locally their own communal resources. Some communities have for generations managed their headwaters as a commons.

Theoretically, the presumption underlying the collective action of the resource users depends on several factors and circumstances. The moral economy approach (Scott, 1976) appears to be promising in the closed corporate village of pre-modern peasantry. The political economy approach (Popkin, 1979) seems to be more suited to the market economy where the peasant communities are incorporated into the larger political economic system in the modern period. The use of these two approaches needs to be articulated clearly in terms of the local and historical background.

9.3 Recommendations

The virtue of the conceptual framework of this study is probably its generality and integrity in the study of the commons. This modified framework constitutes the main theme of geographical study, especially in terms of human-environment interactions in different spatial and institutional arrangements. It can be modified further for a study of other types of common property resources and in other areas. Nevertheless, in order to fulfil the coverage of related variables, this study had to sacrifice depth of analysis in some variables, such as quantitative analysis of the physical and technical attributes of the specific watersheds and the relationship with

the optimal rate of use that would indicate the sustained yields of the watershed system. Further research is needed for this particular analysis. Moreover, it will be useful to continue studying the relationship between agrarian transformation, changes in dependence of watershed resources, and the management strategies employed to fit the new circumstances. In such environments, further study about the way in which the local people assess the values of natural resources is also important for nature conservation policy.

As suggested earlier, wherever possible, existing community-based watershed management should be given the chance to obtain legal status. The government should therefore legalize the right to manage the watersheds for these communities. Furthermore, as it was found that the local communities were not against the constructive involvement of the central government in community-based watershed management, this gesture opens up the feasibility for the state and the local communities to share power and co-manage the local watersheds. In this case, the government will act only as an advisor and provide technical assistance for the local communities. The RFD will no longer be the sole custodian of watershed forests in the North. The state, however, should also be ready to be called upon as the last resort - the third-party negotiator, or the enforcer in some cases. The state may maintain its property rights in the watersheds but grant the rights to manage the local watersheds to the communities that depend upon the watershed forests.

It is also necessary that the delegation of power in the management of watersheds to the local community must be accompanied with decentralization of the

political authority to local governance. Local organizations such as the Tambon Council and Village Committee must be empowered by the central government to be able to manage legally the local resources and enforce the operational rules. However, this is not an easy task. Institutional change in the higher level rules needs the political will to push it through the process of legislation. A long-delayed and struggling Community Forest Bill is a good example of this kind of change.

For the four communities in this study, some specific recommendations are suggested. Ban Luang may need to partition the watershed forest into smaller areas to be managed by each Tambon while the major common headwaters are still co-managed by the whole community. The convention of the *Khamnan* and village headmen should be authorized to enforce non-compliant members to follow the rules. At the Tambon level, Silalaeng's CBWM is a good example of using the Tambon Council as the decision-making body and enforcement mechanisms. Thung Khao Hang's CBWM needs more recognition and support from the government and public to survive through the first stage of institutional evolution. Ban Pae's CBWM with increasing emphasis on recreational value and appreciation of the nature seems to be an ideal type of community-based watershed management for the less resource-oriented local communities in the newly-industrialized economy. In general, the most appropriate CBWM system should not be larger than the Tambon level.

The National Forest Policy that favours large-scale commercial forestry should not be at the expense of local communities. This is especially important in the case of Northern Thailand where community-based watershed management has

successfully prevailed for several decades. Such locally-managed watershed areas do not exist in other regions. This regional context indicates that neither the commercial forest nor community-based forest policies can be used as blanket prescriptions for all local communities in every region.

To achieve the goal of maintaining 40 percent of forest coverage area in Thailand and further economic development the Royal Thai Government needs policies for three major categories of forest:

- (1) the protected and conservation forest including the national parks, wildlife sanctuary, watershed class 1A, and national reserve forests;
- (2) the large scale reforestation and commercial forest; and
- (3) the community forest.

The first category falls within the responsibility of the government agencies, primarily the RFD. The second category rests mainly on the private sector, with close consultation and monitoring by government agencies. The third policy can be implemented through the initiative of local communities with technical assistance from the RFD and NGOs. Community-based watershed management in the North fits into the third category. The implementation of these three policies must consider regional differences, social-economic aspects of the localities, and the institutional framework. At present, the third policy has no legal foundation despite the fact that CBWM already exists. Thus, community-based watershed management should be given highest priority by the government as a most appropriate strategy of protecting the headwaters of the main river basins of Northern Thailand.

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Appendix 1

Guidelines for Interview and Participant Observation

Informant _____ Position _____
 Village _____ Tambon _____
 District _____ Province _____

1. Physical and Technical Attributes of the Watershed

1.1 Degree of subtractability of watershed resources as a result of joint use by members of the community

1.2 By nature or physical condition of the watershed and technical feasibility, can outsiders be excluded from making use of the community watershed?

1.3 By nature or physical attributes of the watershed and technical feasibility, are the watershed boundaries clearly defined or delineated?

1.4 A size of watershed area of this community

1.5 A distance between the village community and the watershed forest

1.6 Status of watershed resources, in terms of the scarcity of wood, water flow, land areas, and minor forest products

2. Community Setting

2.1 The number of eligible users

-household _____
 -population _____
 -men _____
 -women _____

2.2 Patterns of land use

-paddy fields _____ rai
 -uplands _____ rai
 -orchards _____ rai
 -grazing areas _____ rai
 -others _____ rai

2.3 Demands for watershed resources (timber, land, and minor forest products) in the local market

2.4 Types and amount of resource use conflicts in the watershed

2.5 How much do leadership skills influence the formation of community-based watershed management?

2.6 Organizational arrangements and decision makers involved in CBWM institutions.

3. Decision-Making Arrangements in Community-Based Watershed Management.

3.1 Norms, traditions, operational rules, and sanction system that govern day-to-day activities concerning CBWM.

3.2 Government policies, regulations, and guidelines used by government officials that affect CBWM in this local community (collective-choice rules).

**3.3 Legal status of the community watershed, e.g., national park areas,
national reserve forest, watershed class 1A.**

4. Pattern of Interaction of the Villagers in the Use of Watershed Resources

4.1 Collective action and reciprocity

4.2 Free riding, shirking, and opportunism

5. Outcomes and Consequences of Resource Use Under the Governance of CBWM.

**5.1 Efficiency of resource use in terms of users' satisfaction on overall rate of
use and sustained yield of the watershed system.**

5.2 Equity in resource use in terms of users' satisfaction on fair share and equal access to watershed resources.

5.3 Sustainable livelihood security of members of the community under the governance of CBWM institutions.

6. The Assessment of Institutional Performance of CBWM

6.1 Are watershed boundaries and membership of resource users clearly defined?

6.2 Are the operational rules (both right and duty) congruent with the condition of watershed resources and community setting?

6.3 Can individual member of the community participate in modifying the operational rules?

6.4 Are the monitoring measures available?

6.5 Has a graduated sanction system been used?

6.6 Are the conflict-resolution mechanisms available?

6.7 Are CBWM institutions recognized by the government agencies?

6.8 Are CBWM institutions nested in other levels of decision making arrangement?

7. Notes and Additional Comments

Recorder _____
Date ____/____/____

Appendix 2

Questionnaire for Household Survey

Name _____ House number _____
 Village _____ Tambon _____
 District _____ Province _____

1. How much do you think that degree of subtractability in the watershed is, as a result of use by members of the community?

Watershed resources	high	moderate	low
wood, timber			
water flow			
unclaimed lands			
minor forest products			

2. Physically and technically, can outsiders be excluded from access to the watershed?

- () yes, mostly
 () yes, partially
 () not at all

3. Physically and technically, are watershed boundaries delineated clearly?

- () no
 () yes

4. How big is the size of watershed area?

_____ rai

5. How far is from your residence to the watershed forest?

_____ kilometres

6.The scarcity of watershed resources regarding the capacity to respond to the needs of members of the community

Watershed resources	scarce	sufficient	plentiful
timber, wood			
water sources			
unclaimed lands			
minor forest products			

7.The amount of years of schooling of head of the household
_____ years

8.The amount of years of schooling of persons with the highest education in the household
_____ years

9.The main occupation of the household

- () rice farming
- () rice and cash crop farming
- () rice farming and fruit tree growing
- () rice, cash crop, and fruit tree growing
- () cash crop and fruit tree growing
- () cash cropping
- () fruit tree growing
- () wage labour
- () trading
- () others, specify _____

10.The secondary occupation

- () no have
- () yes, specify _____

11. Sources and amount of annual income of the household

- 11.1 from rice _____ baht
- 11.2 from cash crop _____ baht
- 11.3 from fruit tree _____ baht
- 11.4 from cattle _____ baht
- 11.5 from wage _____ baht
- 11.6 from trade _____ baht
- 11.7 from others _____ baht
- Total _____ baht

12. Rice yields _____ *Tang* per rice

13. Land use, land holding size, and land tenure

Land use	Land holding (rai)	Land tenure
paddy field		
upland		
orchard		

14. Are you a member of these groups in your community, and in what capacity?

Group	member	committee	leader
<i>Muang Fai</i>			
BAAC			
Agri-Cooperative			

15. Have you ever participated in these following CBWM activities?

15.1 Patrol in watershed forest

() no

() yes _____ times

15.2 Maintenance and development

() no

() yes _____ times

15.3 Meeting

() no

() yes _____ times

16. What do you perceive about the property right in watershed resources in your community?

- ☐ common property
- ☐ state property
- ☐ open access
- ☐ other, specify _____

17. Do you know about the existence of rules and penalties in CBWM?

- ☐ no
- ☐ yes

18. Do you accept the rules of CBWM voluntarily?

- ☐ yes
- ☐ no, not exactly

19. Have you participated in making or modifying the rules of CBWM?

- ☐ no
- ☐ yes

20. Do you think that the present rules and penalties of CBWM are congruent with the current situation in the community?

- ☐ yes
- ☐ no, because _____

21. Did the external agencies take part in rule making?

- ☐ no
- ☐ yes, specify _____

22. Do you think that the government recognizes the CBWM initiative in your community?

- ☐ yes
- ☐ no, because _____

23. If conflicts and rule violation could not be solved by the mechanisms of CBWM, what solution should be sought?

- ☐ ask the external authorities to mediate
- ☐ law enforcement
- ☐ others, specify _____

24. Do you know about the legal status of your community watershed?

- ☐ don't know
- ☐ national reserve forest
- ☐ national park
- ☐ watershed class 1A

☐ public land

☐ others, specify _____

25. Do you agree to comply with the rules of CBWM?

☐ yes, because _____

☐ no, because _____

26. If you had an opportunity to exploit watershed resources by violating the rules without being noticed by anybody, would you take that opportunity?

☐ no, because _____

☐ yes, because _____

27. Have you ever broken the rules of CBWM?

☐ never (go to question 29)

☐ yes _____ times (answer question 28)

28. Why did you break the rules?

☐ did not know the rules

☐ thought that nobody would notice

☐ thought that there were no harms to the community as the others followed the rules

☐ thought that the others did the same

☐ others, specify _____

29. What is the main motive that brings members of the community together to initiate CBWM system?

☐ awareness of water shortage as a result of watershed degradation

☐ to protect the local resources from exploitation by outsiders

☐ cannot trust officials in protecting the local watershed resources

☐ charismatic leadership

☐ others, specify _____

30. Is your livelihood dependent on the following watershed resources?

Watershed resources	yes	no
timber and wood for building houses		
fuelwood such as firewood and charcoal		
sources of water for cultivation		
cultivable land for upland farming		
minor forest products		
others, specify _____		

31. Whom is to be blamed most for destruction of watershed forest? (please rank)

- () fellow lowland villagers
- () influential capital owners
- () hilltribes
- () government officials
- () others, specify _____

32. In consideration of current situation in the community, will your children remain farming?

- () remain farming
- () change to non-agricultural occupations
- () move to pursue jobs in the city

33. In consideration of present situation and trends, do you think that livelihood of the community will be self-reliant or more dependent on outside society?

- () more dependent on outside society
- () still self-reliant

34. When the local community changes and becomes developed, will CBWM be vital for your community?

- () still vital
- () may fade out

35. In comparison with the past, do you think that there is any change in local control in watershed resources?

- ☐ more control
- ☐ no change
- ☐ losing control

36. In comparison with the past, do you think there is any change in government intervention in the CBWM?

- ☐ increased government involvement
- ☐ no change
- ☐ decreased government involvement

37. In comparison with the past, do you think there is any change in threats from outsiders?

- ☐ increased threats from outsiders
- ☐ no change
- ☐ decreased threats from outsiders

38. Have you ever sold your lands?

- ☐ no
- ☐ yes, because _____

39. Are you still looking for new farm lands in the forest land?

- ☐ no
- ☐ yes

40. Are you satisfied with the rate of resource use obtaining from the watershed under the CBWM regime?

- ☐ yes, because _____
- ☐ no, because _____

41. Are you satisfied with equity in access to the watershed and distribution of shares under the CBWM regime?

- ☐ yes, because _____
- ☐ no, because _____

42. Are you satisfied with your sustainable livelihood security under the CBWM regime?

- ☐ yes
- ☐ no, because _____

43. What is a potential threat to institutional stability of CBWM system in your community?

- () increased rule violation by members of the community
- () threats from influential outsiders
- () the government
- () others, specify _____

44. General opinion and recommendation about your CBWM system.

Interviewer _____
Date ____/____/____

Appendix 3

Contingency Tables of the Choice of Opportunism and Significantly Associated Variables

1. Annual income per household (Baht)

Opportunism	10,000 and less	10,001 - 30,000	30,001 - 50,000	50,001 and more
no	78.7	90.9	98.1	94.4
yes	21.3	9.1	1.9	5.6
Total	100.0	100.0	100.0	100.0

Cramer's V = .22

2. Upland holding size (rai)

Opportunism	no upland	3.00 and less	3.01 - 5.00	5.01 - 10.00	10.01 and more
no	90.9	95.4	90.0	88.6	92.4
yes	9.1	4.6	10.0	11.4	30.6
Total	100.0	100.0	100.0	100.0	100.0

Cramer's V = .25

3. Status in other social groups

Opportunism	non-membership	membership
no	85.1	94.9
yes	14.9	5.1
Total	100.0	100.0

Phi = .16

4. Participation in monitoring

Opportunism	no	yes
no	87.0	95.6
yes	13.0	4.4
Total	100.0	100.0

Phi = .13

5. Participation in maintenance

Opportunism	no	yes
no	85.3	96.6
yes	14.7	3.4
Total	100.0	100.0

Phi = .18

6. Participation in meeting

Opportunism	no	yes
no	83.0	92.7
yes	17.0	7.3
Total	100.0	100.0

Phi = .15

7. Perception about the property regimes of the watersheds

Opportunism	common property	state property	open access
no	92.8	80.8	80.0
yes	7.2	19.2	20.0
Total	100.0	100.0	100.0

Cramer's $V = .18$

8. Participation in rule making and amending

Opportunism	no	yes
no	84.3	96.9
yes	15.7	3.1
Total	100.0	100.0

Phi = .20

9. Preferred conflict resolution mechanisms

Opportunism	government as a third party	law enforcement	others
no	61.7	95.2	71.4
yes	38.3	4.8	28.6
Total	100.0	100.0	100.0

Cramer's $V = .41$

10. Dependence on timber

Opportunism	no	yes
no	97.8	86.0
yes	2.2	14.0
Total	100.0	100.0

Phi = .18

11. Dependence on fuelwood

Opportunism	no	yes
no	98.1	87.7
yes	1.9	12.3
Total	100.0	100.0

Phi = .13

12. Dependence on cultivated land

Opportunism	no	yes
no	93.5	65.9
yes	6.5	34.1
Total	100.0	100.0

Phi = .32

13. Perception about change in local control in the resources

Opportunism	increase	no change	decline
no	98.6	88.9	86.5
yes	1.4	11.1	13.5
Total	100.0	100.0	100.0

Cramer's V = .17

14. Perception about Change in threat from outsiders

Opportunism	increase	no change	decline
no	71.2	96.3	93.6
yes	28.8	3.7	6.4
Total	100.0	100.0	100.0

Cramer's V = .29