

# COMMUNITY ALLIES:

## FOREST CO-MANAGEMENT IN THAILAND



Research Network Report

Number 2 • August 1993

## ***The Southeast Asia Sustainable Forest Management Network***

The objective of the Southeast Asia Sustainable Forest Management Network is to study degraded natural forests where community management may be a viable strategy in establishing access controls and thereby stabilizing forest use. The Network is comprised of a small, select coalition of Asian colleagues, many of whom have collaborated together for years, both with each other and with Network facilitators. The solidarity of the Network members is based on a common commitment and well-defined focus on exploring alternative management strategies for Asia's disturbed natural forest lands. The Network's strategy has been to move away from conventional, academic research toward more applied, interdisciplinary studies which have both practical and policy relevance. Through case diagnostic studies, the work attempts to capture the voices and needs of forest communities and to communicate their indigenous knowledge and perspectives on the human-forest relationship. To that end, the national teams in Thailand, Indonesia, and the Philippines are developing long-term working relationships with community members to learn more about their forest management issues, resource-use systems, and problem-solving strategies. The emphasis of the Network's research includes the ecology of natural regeneration, the economics of non-timber forest product systems, and the community organizations and institutional arrangements which support participatory management. The lessons stemming from the research aim to inform field implementation procedures, reorient training, and guide policy reform.

*For more information about the Network and its publications, please contact Dr. Mark Poffenberger and Betsy McGean at the address below.*

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*Front cover photo:* Uncle Chan, a Karen hill tribe farmer, cultivates rattan in the understory of the regenerating evergreen forest of Nam Sa.

*Back cover photo:* Community-protected Lisu spirit forest conserves Nam Sa's upper watershed, while also serving as a religious sanctuary and source of important non-timber forest products.

# COMMUNITY ALLIES: FOREST CO-MANAGEMENT IN THAILAND

## **Southeast Asia Sustainable Forest Management Network**

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## **PREFACE**

As active members of the Southeast Asia Sustainable Forest Management Network, the Thailand research teams have been engaged in diagnostic field research at several sites for the past two years. This report provides a preliminary discussion of their research findings concerning community forest management, highlighting case studies in Dong Yai, located in Ubon Ratchathani Province in the Northeast, and Nam Sa subwatershed in northern Chiang Mai Province. The information and the recommendations provided should be viewed as tentative, requiring further study, analysis, and field verification. The study teams appreciate the grants they have received from the Rockefeller and Ford Foundations, which funded the field research from which this monograph evolved. The teams would also like to acknowledge the encouragement and cooperation from the Royal Forest Department (RFD) and its regional offices. Finally, the researchers extend their gratitude to the villagers of Dong Yai and Nam Sa for sharing their knowledge and experiences with us.

The Southeast Asia Sustainable Forest Management Network Secretariat, based at the Center for Southeast Asia Studies at the University of California at Berkeley, would also like to acknowledge its cast of supporters and contributors. We are most grateful to John O'Toole at the Rockefeller Foundation for his continued interest in the subject of community forest management and his commitment to support of the Network's activities over the past two years. We would like to specifically thank Molly Kux and Toby Pierce of USAID for their intellectual guidance to the Network, as well as Janis Alcorn, Stephen Kelleher, and Richard Richina with the USAID-supported World Wildlife Fund's Biodiversity Support Program for providing ideas and financial assistance for the production and publication of this study. At the University of California at Berkeley we owe thanks for the excellent work of cartographer Jane Sturzinger, artist Anne Higgins, editors Bojana Ristich and Stephen Pitcher, and the administrative support of Karin Beros, Linda Rutkowski, and Jeri Foushee. The facilitators of the Network are indebted to Robert Reed, Eric Crystal, and Cynthia Josayma at the Center for their consistent cooperation and overall institutional support. Finally, the Secretariat would like to extend its heartfelt thanks to all the member scientists of the Southeast Asia Network, whom we greatly value as friends and colleagues, for their hospitality during our field visits, and for their commitment to this important research.

## **EXECUTIVE SUMMARY**

Thailand has experienced rapid deforestation over the past three decades, reducing its forest cover in half. Despite the current lack of a formal national policy framework which specifically acknowledges community rights and responsibilities in co-managing public forest lands, widespread, often spontaneous grass-roots initiatives have been taken by local communities to protect and manage their surrounding forests. A national inventory conducted by the Royal Forest Department (RFD) documents over 12,000 rural community groups protecting forest patches ranging in size from 1 to 4,000 hectares for a variety of religious, ecological, and economic purposes. Many of these activities are operating informally, some under pilot programs and others through local agreements between the Tambon (subdistrict) Council and the RFD.

To increase understanding of locally appropriate systems of community forest management as an alternative to custodial, bureaucratic forest controls—which have generally failed in controlling access—applied, diagnostic research undertaken over the past two years has attempted to document the lessons emanating from selected field experiences. This monograph describes two different systems of community forest management, Dong Yai in the Northeast and Nam Sa in the North. In both cases, rural communities and the RFD are breaking new ground by working together to regulate access and regenerate degraded natural forests.

In Dong Yai, former kenaf fields now under community protection have naturally regenerated into the largest remaining lowland stand of dry dipterocarp forest in the region. The case illustrates the persistent threats on the resource as it accrues value; the strong forest dependencies of Dong Yai's twelve communities, especially on non-timber forest products; and hence the villagers' strong motivation in ensuring the sustainability of forest benefit flows into the future. The support and leadership provided by the Tambon Council, RFD's regional forestry office, and researchers at Kasetsart University coalesced to create a climate in which communities led by village elders were empowered to organize into local forest protection committees and establish their own use rules and responsibilities for Dong Yai.

In the northern subwatershed of Nam Sa, conflicts between midland and upland hill tribes based on unsustainable land-use practices were leading to rapid forest and environmental deterioration. The case highlights the incremental strategy of reducing social conflict by organizing microwatershed land-use committees and networking resident community groups through a coordinating forum. Tools such as ecological information and three-dimensional maps improved villagers' understanding of the importance of upstream-downstream watershed linkages. With the technical assistance of the RFD and the cooperation of the midland Karen people, Hmong and Lisu tribes are in the process of abandoning their steep-slope swidden practices and replacing them with upland forest protection and lowland, irrigated paddy cultivation. Decentralized controls over clearly defined microwatershed areas by organized local hamlets have reduced threats of fire, illegal logging, and upland erosion and are resulting in impressive natural forest regeneration.

The communities of Dong Yai and Nam Sa are pioneers in a new age of participatory forest management. They are proving that their intimate involvement as allies, collaborators, and partners with the RFD forms what may well be the only sustainable foundation for the future protection and management of Thailand's natural forests.

## NATIONAL OVERVIEW

Like most developing South and Southeast Asian nations characterized by high population and economic growth rates, the Kingdom of Thailand has suffered severe deforestation during the last half century. Particularly over the past three decades (1961–91), these trends are reflected in the decline of nearly one-half the country's entire forest, from 54 percent to less than 28 percent cover (see Figure 1).<sup>1</sup>

A diverse and complex set of interrelated causes and effects can be attributed to such patterns of forest loss. The primary factors fueling Thailand's cycle of deforestation have been twofold: conversion to agriculture and logging. The conversion of forest to farm has been spurred by land hunger and competing use pressures from fast-growing human populations. Thailand's population more than doubled between 1961 and 1991, rising from 23 to 58 million, while annual population growth rates in the Northeast region ranged between 3.3 and 3.8 percent during the 1960s and 1970s.<sup>2</sup> With the expansion of European economic markets and foreign assistance packages during the 1970s, Thailand also experienced a rapid increase in field crop production, especially upland cash cropping on formerly forested lands. Other factors responsible for forest land conversion have included the Land Certification Program (STK), which regularized villagers' claims to forest lands by allocating land-use certificates, and the 1975 amnesty granted to "illegal residents" of designated reserve forests.<sup>3</sup> Subjected to a virtual management vacuum, the majority of Thailand's public forests, covering 40 percent of the country, have functioned as an "open access" resource. The forests have served as a frontier land bank for the nation's expanding agricultural and development needs. These transformations have frequently led to overexploitation and serious ecological degradation.

Until the mid-1960s, almost all of Thailand's logging concessions were granted in the North, covering approximately 40 percent of that region's land area.<sup>4</sup> However, in 1968 a government strategy to accelerate economic development profoundly changed the situation. Over five hundred thirty-year logging concessions were vetted throughout the Kingdom, encompassing close to one-half the nation's geographical area and most of its designated reserve forest. The following years

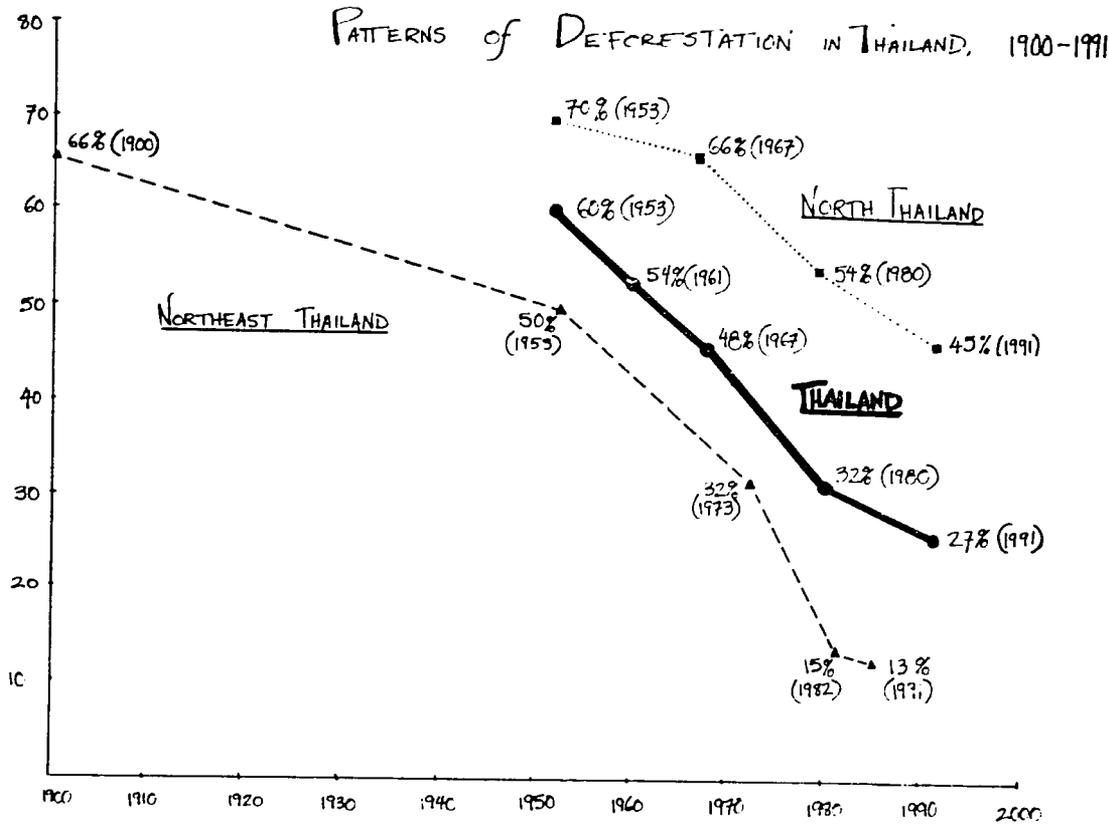


Figure 1

SOURCES: Poffenberger, (ed) (1990) KEEPERS OF THE FOREST  
 ROYAL FOREST DEPARTMENT, FOREST STATISTICS (1992)

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witnessed rapid commercial exploitation of Thailand's most valuable and accessible timber, including its famous teak (*Tectona grandis*) stands in the North. As in many developing countries today, the poor, rural Thai farmer has often been blamed for the destruction of such forests, which have already been thoroughly logged over by powerful timber concessionaires, often in partnership with Thai public enterprises.

Fortunately, indications of heightened awareness and new directions in forest management have been emerging over the past decade in Thailand, paralleling similar trends in other Asian nations. With the rise of environmental movements, including vocal, urban-based non-governmental organizations (NGOs) and journalists, public attention has been turned to such issues as upland deforestation and illegal logging, downstream erosion, landslides and flooding, and conservation of biodiversity in protected areas. Nonetheless, until very recently there has been less consideration for the needs of forest-dependent rural communities and their potentially strategic role as allies in the protection and stabilization of forest resources.

Pressured in part by this increase in public concern over forest conservation and poor management, in 1985 the Thai government responded by issuing a new National Forest Policy. While the policy took positive steps in encouraging environmental awareness, interagency cooperation, technical innovation, and public participation in forest management, it failed to specifically address the needs or tenurial rights of forest communities. Nor did the policy offer any strategies to ensure incentives for community participation in management. To the contrary, several years later the national Khor Jhor Khor, or Forest Land Resettlement program, was launched, further underscoring the lack of consideration for rural forest communities. First initiated in the North and Northeast, the program enlisted the Thai military to oust and relocate villagers from certain forests designated as protected areas and critical watersheds and to undertake a massive reforestation effort with fast-growing exotics such as eucalyptus. Facing the problems of widespread tenure insecurity and failed earlier efforts at land reform, the ambitious resettlement scheme aimed to target up to 10 percent of the country's population, or over 5 million people currently residing in the nation's public forest lands.<sup>5</sup> However, riddled with strong resistance movements and public protests across the Northeast—often spearheaded by monks, village leaders, and NGO activists—the Khor Jhor Khor program was finally revoked by the new democratic government in 1992. Earlier, in 1989, in another important turn of events, a tragic

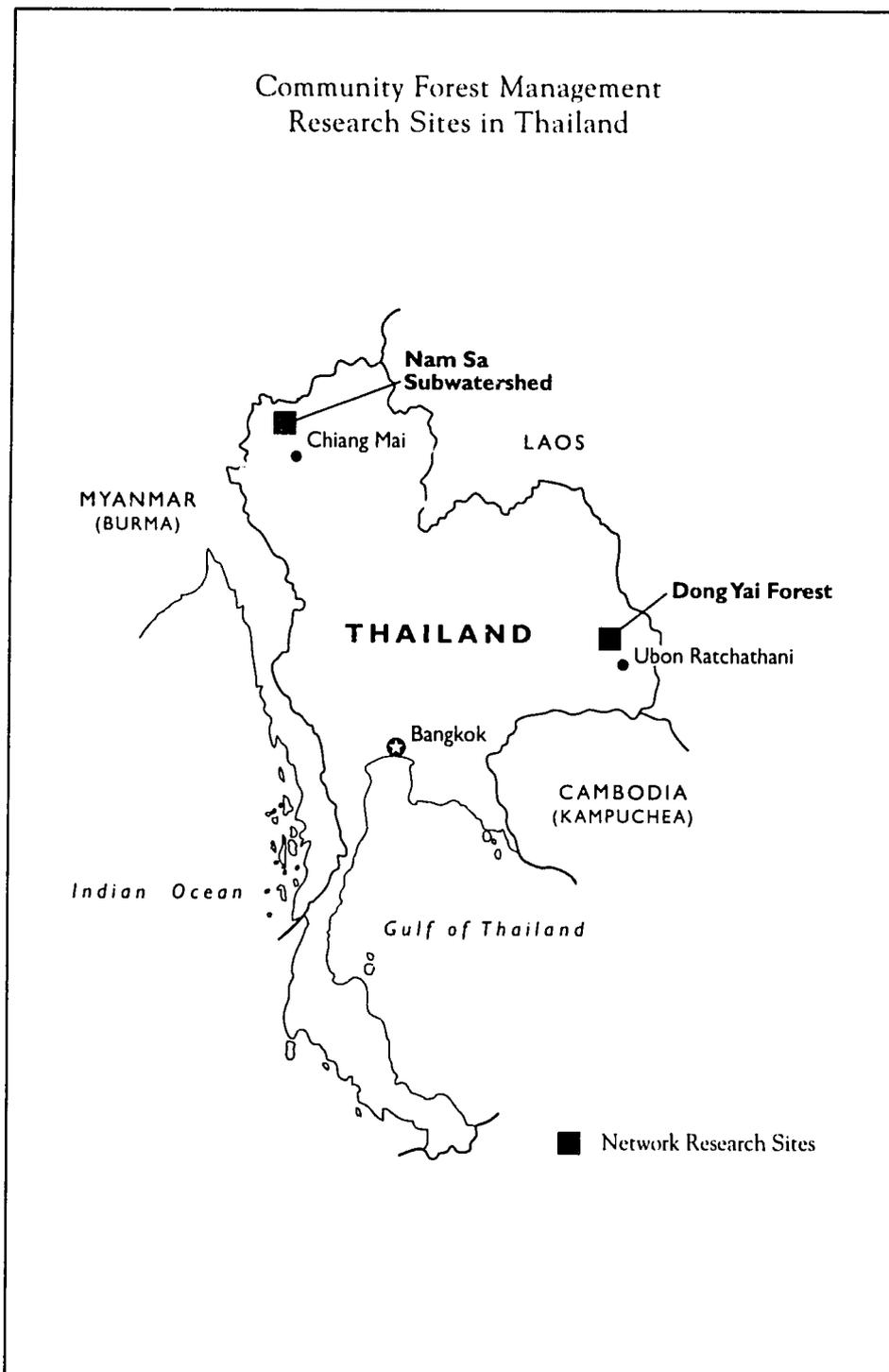
landslide blamed on commercial watershed deforestation killed hundreds of people in the South, inducing the government to enact a nationwide ban on all logging and to begin developing a more strategic paradigm for forest management.

Experiences over the past several years indicate that planning in Thailand's forestry sector is shifting to an increasingly progressive and responsive approach toward rural communities. The Seventh Five-Year National Economic and Social Development Plan (1992-96) emphasizes the crucial role of local communities in resource management, while also linking issues of rural poverty to sustainable forestry development. As of this writing, the Parliament is reviewing a draft Community Forestry Act, which would provide crucial political support and legitimacy to collaborative endeavors between communities and forestry field staff in protecting and managing village forests.

Despite the current lack of such a formal policy framework which specifically addresses community rights and responsibilities in managing public forest lands, it is striking to note the widespread, often spontaneous grass-roots initiatives by local communities across Thailand to organize themselves around forest protection and management. A national inventory conducted by the Royal Forest Department (RFD) in 1992 documented over 12,000 traditional rural community groups protecting forest patches ranging in size from 1 to 4,000 hectares for a variety of religious, ecological, and utilitarian uses.<sup>6</sup> These activities, most of which are unofficial since Thailand's reserve forest is under the sole jurisdiction and control of the RFD, are operating informally. Some are implemented under pilot programs and others through local agreements between the Tambon (subdistrict) Council and RFD.

In an effort to increase understanding of locally appropriate systems of community forest management—and thereby encourage tangible, equitable alternatives to custodial, bureaucratic forest controls—it is now critical to assess and closely document the successes and lessons arising from field experiences. Based on the first round of diagnostic research conducted by Thai members of the Southeast Asia Sustainable Forest Management Network, the following two case studies, in the Dong Yai forest of Northeast Thailand and the northern Nam Sa sub-watershed, help illuminate some of the important ecological, social, economic, and institutional aspects of community-empowered systems of forest management (see Figure 2).

Figure 2



## **BIG FOREST: THE CASE OF DONG YAI**

### ***Introduction***

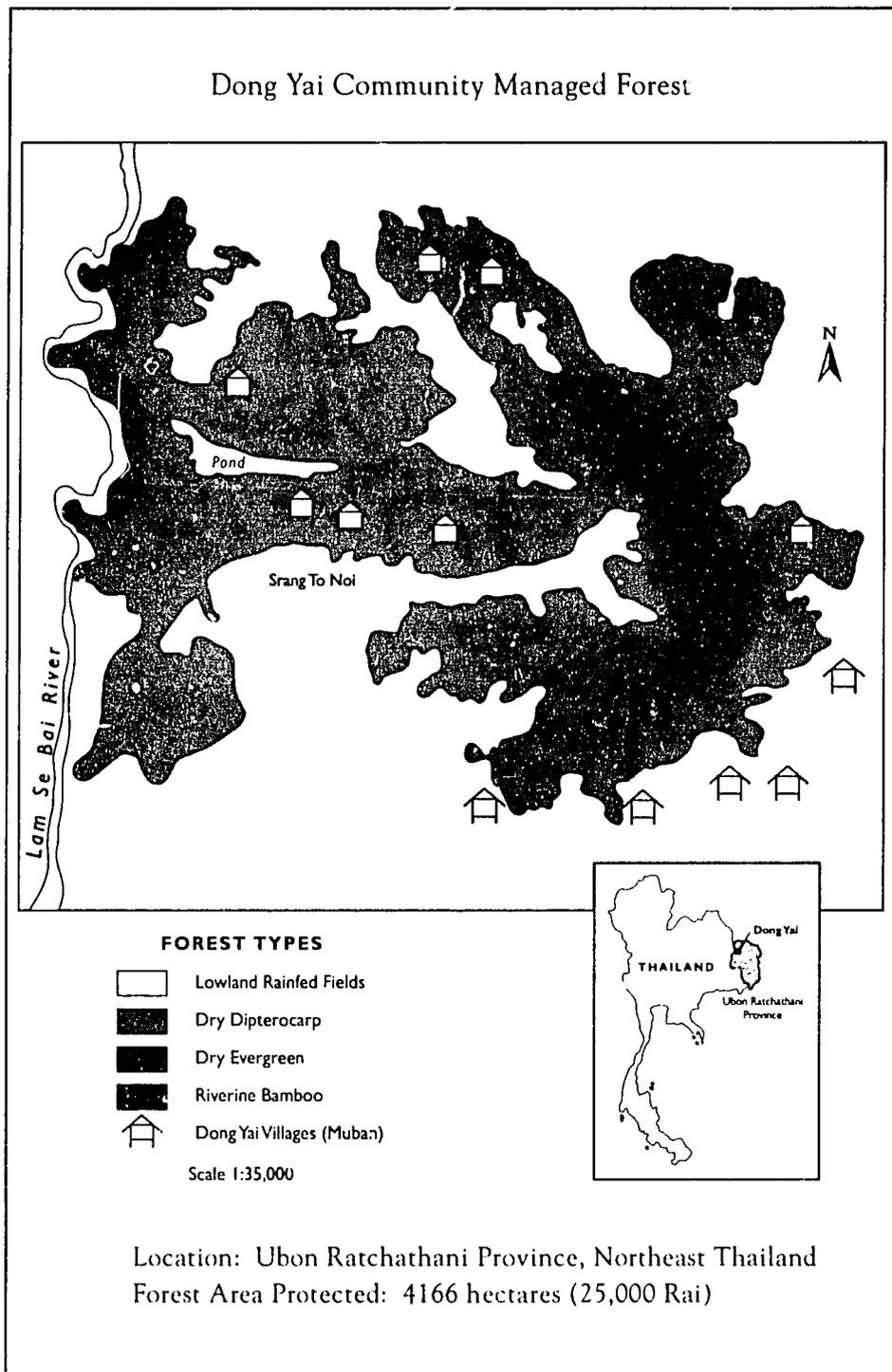
In the vast Northeastern region of Thailand, bounded by the borders of Laos and Cambodia, lies the corner province of Ubon Ratchathani. Seventy-five kilometers northwest of the provincial capital, situated near the town of Hua Taphan and the Lam Se Bai tributary of the great Mekong River, a socio-ecological experiment is underway. Actively protected by twelve surrounding villages, a large, 4,000-hectare (24,000 *rai*; 6 *rai* = 1 hectare) tract of dry dipterocarp, evergreen, and bamboo riverine forest named Dong Yai (big forest in Thai) testifies to an exciting evolution in Thailand's forest management history (see Figure 3). Improved communication channels and cooperation among local village groups, Kasetsart University researchers, and the RFD are supporting an emerging success story in community-led forest protection, management, and benefit-sharing.

### ***Background***

Historically isolated from the Kingdom's capital of Bangkok, the Northeast is the country's largest, poorest, and most populous region. With one-third of Thailand's entire population, the Northeast has experienced annual population growth rates far exceeding the national average of 2.6 percent, as well as significant interprovincial and interregional migration flows since the middle of the century. The per capita income in this region is only 40 percent of the national average,<sup>7</sup> while agricultural productivity remains low and vulnerable due to poor soils and inadequate rainfall.

Since the late 1950s, widespread conversion of upland forest lands to rainfed cash crops such as kenaf, cassava, rice, and corn has contributed to the sequential process of deforestation, soil erosion, desiccation and floods, and declines in crop yields. Forest degradation in the region peaked in the 1970s, when the average annual deforestation rates in the Northeast watersheds exceeded 10 percent (see Figure 1). Only when the limits on available forest for conversion to arable cropland were approached did the deforestation rate decline to 7 percent, leaving by 1991 a mere 13 percent forest cover in the entire Northeast.<sup>8</sup> Meanwhile, shortages of wood and non-timber forest products have worsened in the region, exacerbated by the highest consumption rates of fuelwood per capita in the country (e.g., Dong Yai = 4.85 cubic meters per house-

Figure 3



hold). Furthermore, the villages in the Northeast have historically strong socioeconomic dependencies on a broad range of other forest products, including edible and medicinal plants. Within the context of this marginalized environment, the villagers of Dong Yai are focusing their energies on sustaining their most valued resource, the surrounding regenerating forests.

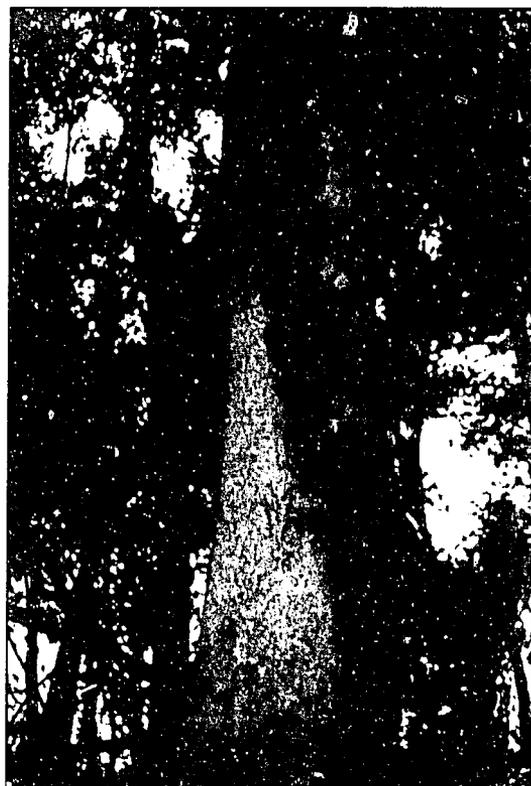
The twelve forest village communities, or *mubans*, of Dong Yai are each comprised of 100–120 households. The subdistrict headquarters is located at Srang To Noi and encompasses a total of 1,300 households, or 7,500 people. Dong Yai's twelve villages are substantially poorer than the average in Thailand, earning about 17,800 baht (\$740) per household annually. The major local occupation is lowland paddy farming, supplemented with vegetable cultivation and livestock rearing. Due to unfavorable agroclimatic factors, including scant and unpredictable rainfall, poor, sandy loam soils, and high erosion rates (in part due to deforestation over the past two decades), the Dong Yai area, like the Northeast region as a whole, has suffered from droughts and relatively low crop productivity. While 96 percent of the farmers in Dong Yai are landowners with holdings of an average 20 *rai* (3 hectares), rainfed paddy yields are low, producing only one-third to one-half of the national average.<sup>9</sup>

In part due to the vagaries of the agricultural system, in-migration to Ubon Ratchathani Province has been minimal. This differs from the more general trends through the last half century of consistent migrant flows through many of the region's provinces, such as Udonthani in the North and Loei and Chaiyaphum in the West. Dong Yai's settlement stability is illustrated by its composition: 96 percent of the population is local.

### **Forest History**

Village elder Punja Tanomchat recalls that Dong Yai was first settled over 150 years ago. His recollection is confirmed by the living history of the village's oldest planted *lamut* (*Manilkara kauki*), or plum tree. The area's original settlers migrated from Muang Samsip District, 20 kilometers southeast of Dong Yai. The forest had been periodically cleared by villagers for agriculture during the past 100 years, subjected informally to use as an open access resource with few controls or regulations. In the 1960s and 1970s, the RFD began logging on a 30-year rotation several of the 10 designated compartments of Dong Yai's "multiple use" forest. Concurrently, 28 years ago, 50 percent of Dong Yai's





Clockwise from upper left: Dong Yai's regenerating dry dipterocarp forest; one of Dong Yai's elder collectors of *Shorea obtusa* gum; mother tree with good seed stock, left standing by farmer in former kenaf fields, facilitates natural regeneration of Dong Yai's forest; Khun Prom Chaito, an avid gatherer of forest products.



Bangkok medicinal market: traditional herbal remedy for high blood pressure is prepared from twelve wood and non-timber forest products from North and Northeast Thailand.



The golden apple (*Aegle marmelos*) is an important forest product, high in vitamin C and widely used as a medicine throughout Thailand and Asia.

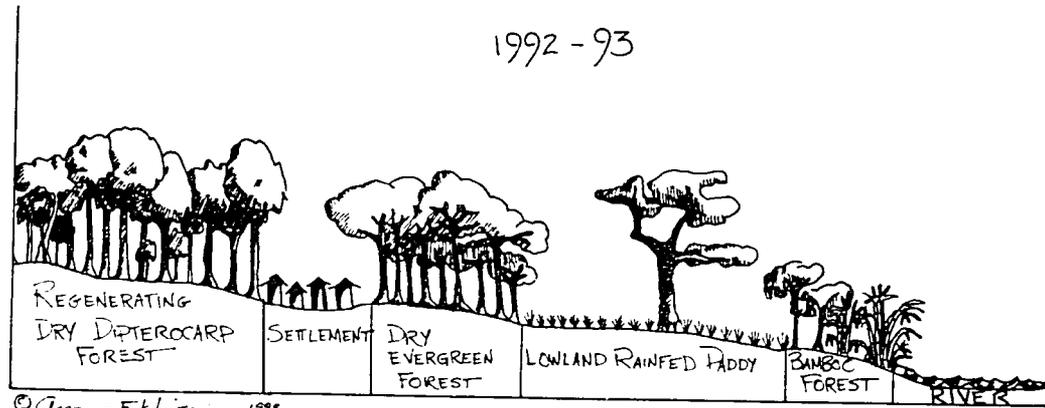
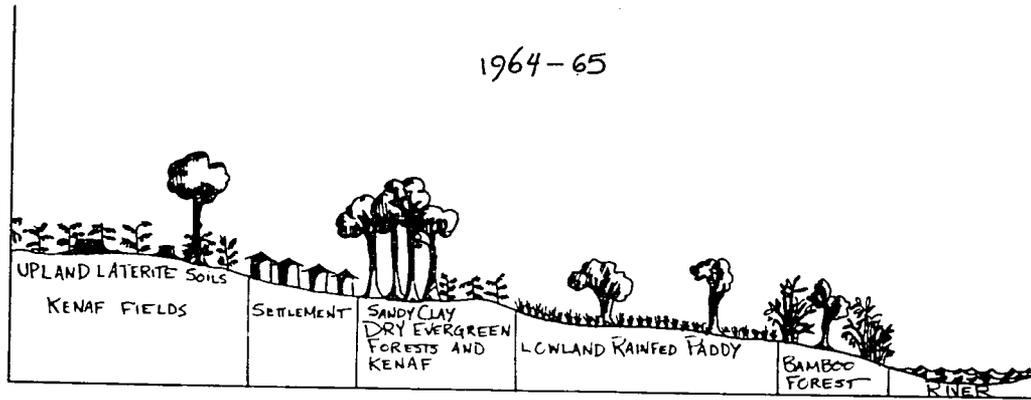
upland forest was cleared for kenaf cultivation by the 12 resident villages. Each family cleared communally designated plots of 4–5 *rai*. Today, despite increasing land-use pressures in the area, these former kenaf fields have converted back to vigorous and healthy forest, protected and managed by Dong Yai's village families. The intricacies of this human-ecological process of forest regeneration in the face of resource scarcity offer lessons of wider relevance concerning land-use suitability, natural forest regeneration, and incentives and social structures for community management.

The confluence of several factors provided a favorable opportunity for the natural regeneration of Dong Yai's dry dipterocarp forest. In 1964, when farmers cleared the forest for kenaf cultivation, they typically left coppice stumps and large "mother" trees standing in the fields. Only two years after the forest conversion to kenaf, the regional price of the crop plummeted. The farming families made the economic decision to abandon their kenaf cultivation in favor of more attractive alternatives. Most of the kenaf lands were geographically situated at a slight topographical elevation on undulating uplands characterized by poor lateritic soils and limited water supplies. Since the farmers were already engaged in farming their lowland paddy fields, it became practical to abandon the marginal upland crops and concentrate on expanding and improving the more lucrative lowland paddy and vegetable fields (see Figure 4). Due to relatively low human and livestock population pressures in the area at that time, additional lowlands for paddy cultivation were available to the farmers. Hence, the kenaf fields were given a respite from further exploitation pressure. Despite occasional outbreaks of fire, the hearty coppice stumps that had remained intact in the fields began producing vigorous shoots.

The outcome of rapid coppice regeneration was graphically described by the current Tambon Council leader, or *kamnan*, who recalled as a young boy that 1,000 pole-size trees per *rai* (6,000 saplings per hectare) had sprouted by the third year after the kenaf was abandoned. This coppicing process was supplemented with the successful although slower system of seedling propagation derived from the mother trees.

In 1989 the RFD decided to revoke the logging compartments in Dong Yai and to maintain the tract as reserve forest. Legally, reserve forest falls under the tenuria<sup>1</sup> and management jurisdiction of the RFD. The designation curtails villagers' rights to certain benefits or authority to make decisions regarding forest use. However, in this case the RFD regional officers encouraged the villagers to cooperate with the protec-

# CHANGING LANDUSE PATTERNS IN DONG YAI, N.E THAILAND



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Figure 4

tion objectives of the reserve forest. With the support of the Tambon Council, the general village committees informally requested each village family to assume responsibility for forest protection of small patches.

As the land began to regenerate rapidly under protection, wood and non-timber forest products flourished. The Dong Yai villagers grew acutely aware of the increasing value of their forest resource. They also came to understand the periodic threats from forest fires. Frequently, villagers from neighboring districts that lacked forests would travel to Dong Yai and set fires in order to more easily collect burned, fallen wood and graze their cattle on newly germinated grasses. During the rainy season, villagers from afar would travel up to sixty kilometers to collect the many varieties of mushrooms in the Dong Yai forest. Over time, outside threats of fires and excessive exploitation mounted. In badly degraded areas adjacent to Dong Yai, scarcities of water, timber, fuelwood, and non-timber forest products grew starkly evident to Dong Yai residents and placed even greater pressure on the Dong Yai forest.

In the late 1980s, the *kamnan* called an important *tambon* meeting to further raise community awareness and discuss the increasing problems of forest overexploitation. Ultimately, the threats of uncontrolled access, as well as the opportunity to change the situation, proved the decisive factors in motivating the Dong Yai communities to adopt a more organized, proactive role in forest protection and management.

Realizing the potential of the community as an ally, in 1989 a sympathetic regional forest officer named Nares, together with several forestry professors from Kasetsart University, began working with the community and offered a training course in forest protection and management to Dong Yai's village leaders, or *puyaibans*. The technical course covered fire prevention and control, silvicultural practices, and boundary demarcation—the result of which informally designated Dong Yai the “Conservation Forest for the Community of Tambon Srang To Noi.” This cooperative intervention by the RFD proved strategic, laying the foundation for improved relationships between the communities and forest agency, as well as the RFD and Kasetsart research faculty. The newly trained *puyaibans* enthusiastically returned to their villages to transfer their new skills and learning to members of the community. Further encouraged by the leadership of the Tambon Council, in 1992 each of the twelve *mubans* formed a “Forest Protector Group,” or Pookitugpaa. Each village elected ten representatives to

meet twice monthly and assume the primary role of forest protection and management decision-making. Initiating an informal system of watching, each village was responsible for protection of the geographical area that had originally been designated as its households' kenaf fields. The transfer of training skills and reorientation by the *puyaibans* helped to further solidify the groups' organizational capacity and operational field strategies. As the Pookitugpaa became recognized by the RFD and acknowledged with rights and responsibilities, a protection and usufruct-sharing agreement between parties was signed. Although not legally sanctioned, this agreement instilled greater confidence and gave legitimacy to the community.

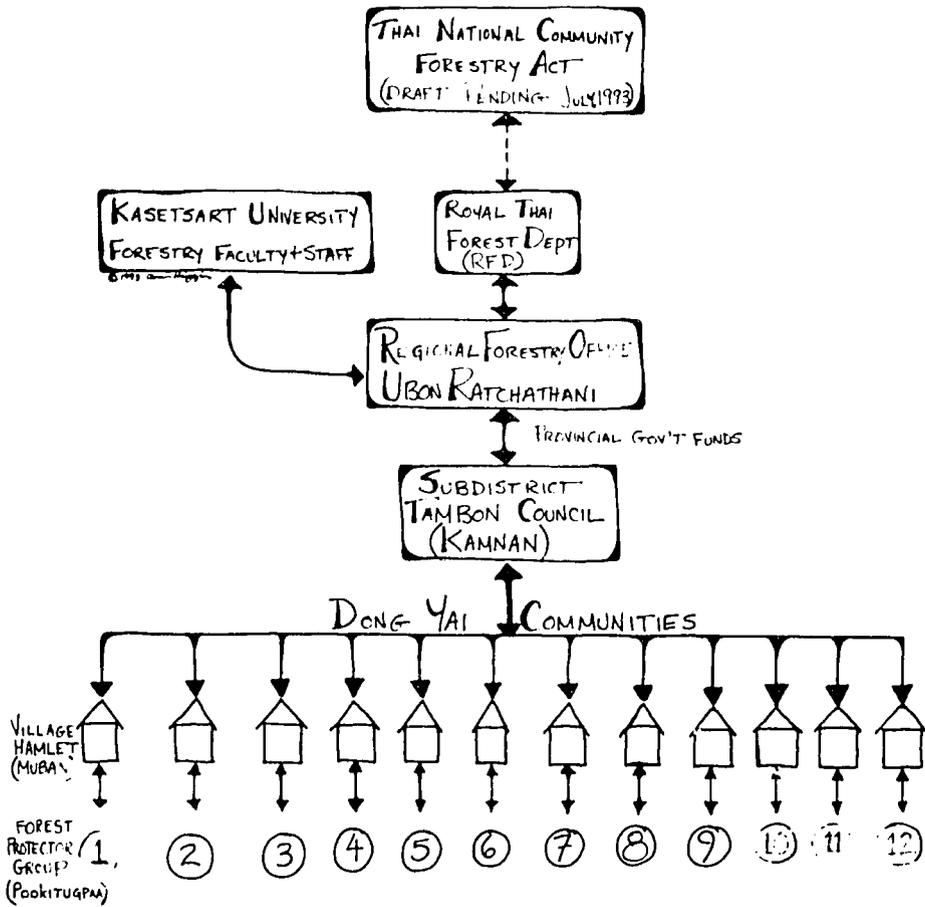
### *Evolving a Community Management System*

While the institutional arrangements in Dong Yai still remain unofficial due to the lack of a formal national policy which recognizes community forest rights, the socio-ecological system is relatively stabilized. The ongoing process of community participation, solidarity, and empowerment in the management partnership of Dong Yai's forest underscores the significance of "unwritten policy" when translated to practical action. The working relationship among the RFD (at the national, regional, and local level), university researchers, and resident villagers is coordinated by a local Tambon Council, which serves as a key mechanism for communication and consensus among the village groups. The institutional structure developed for collaborative management heavily depends upon the successful role played by the Tambon Council as liaison between the regional forestry office and Dong Yai's village groups (see Figure 5).

Patrolling by the twelve Forest Protector Groups is conducted by 2–3 villagers daily on a rotating basis during the dry season. The geographic patrol area is specific for each *muban*, covering about 2,000–3,000 *rai* (333–500 ha.) per village. Collection of non-timber forest products remains open to all, including outsiders who still travel long distances to collect dried wood and seasonal mushrooms. As the number of collectors continues to increase and mushroom supplies diminish to unsustainable levels of production, some Dong Yai residents express skepticism over the open access policy afforded to outside "free-riders." Nonetheless, while the declining supply of mushrooms is cited as the most frequent major complaint by Dong Yai residents, open collection of non-timber forest products is permitted for now. Conflicts occur very infrequently. In the future, in order to satisfy local demand as a

Figure 5

### DONG YAI COMMUNITY FOREST: INSTITUTIONAL STRUCTURE FOR COLLABORATIVE MANAGEMENT



**Best Available Data**

first priority, it may be that the Forest Protector Groups will need to decide on stricter regulations to limit numbers of outside mushroom collectors and quantities extracted.

In contrast to the uncontrolled collection of non-timber forest products, and as a response to the growing pressures of timber extraction for house construction, the communities' prescribed regulations for tree-cutting are more stringent. Certain species are prohibited from all cutting, including the highly valued *yang* (*Dipterocarpus alatus*) and teak. Harvesting of other tree species by villagers is allowed on a fee basis but only for domestic purposes. A permit for the desired tree must first be approved by the "owner" or steward of the kenaf field in which the tree sits and subsequently by the Tambon Council. Each tree is priced by the council based on quality and size. The fee is then contributed to either the "owner" or (if located on communal lands) to the general village development fund. On average, a village in Dong Yai limits the annual harvest to one hundred or fewer trees, with a general maximum limit of two large trees per family. The Tambon Council maintains a record of all transactions. To help prevent timber violations by speculators, a rule has been issued which allows the sale of only one new house per family every twenty-five years.

The community groups' forest protection rules entail a graduated strategy of enforcement. On the first violation, a verbal warning is issued; second, a fine of 500 baht per tree is imposed. Finally, the repeat offender is turned over to the RFD. To date, cooperation has been encouraging, and only warnings have been issued. On average, one or two significant conflicts arise each year. Recently a group of twenty outsiders invaded the forest with pushcarts to gather wood. The *puyai-ban* was immediately informed by the patrol members and approached the outsiders to explain that the forest was under Dong Yai community protection and regulation. While he decided to allow the group to depart with their collected materials, he also warned them that next time they would be reported to the authorities and punished. As a line of first defense, such social persuasion or peer pressure generally works quite effectively in Dong Yai.

Although the community system of organized tree-harvesting is officially illegal in reserve forest areas, in Dong Yai the regional RFD recognizes the Tambon Council and villagers as key allies in co-management. Hence, RFD supports the *mubans'* self-devised rules of twinning use and conservation. Much of the forest land in the vicinity has been registered by farmers under the STK program, which can theoret-

ically allow conversion to private ownership. It is doubtful, however, that private entitlements will be granted to these farmers due to the land's legal status and current value as regenerating reserve forest.

According to the *kamnan*, the most persistent threat to the Dong Yai forest continues to be fires, many of which are induced by collectors. He notes the rapid improvement in useful forest products and tree height and girth when the forest is successfully protected from fire. During the peak of the dry season in March and April, small fires may break out several times every day. The community employs multiple control techniques: cutting weeds for fire breaks, raking away leaf litter, announcing outbreaks over the village loudspeaker, spraying with crude water extinguishers and sand, and beating fires out with sticks and palm fronds. In the majority of cases, while the fire destroys understory layers and inhibits coppice regeneration, it often stimulates mushroom growth and tends not to damage the larger forest trees.

In terms of future needs and directions, the *kamnan* advocates further material and logistical support for fire-fighting. Additionally, for the past year the Forest Protector Groups have been nominally supported by funds from the provincial government, with a small budget of 2,000 baht (\$80) per month for each group, divided into honoraria of 200 baht for each of the ten group members. This contribution has served as a symbolic incentive which acknowledges the importance of the protection work being carried out by the members. The *kamnan* is concerned over the insecurity of future funds, but when questioned whether he feels members would continue their tasks on a purely voluntary basis, he is convinced that they would.

The villagers' top management priority at this point in the evolving program is to enhance the forest's productivity by enrichment underplanting with the popular sweet bamboo (*Dendrocalamus asper*). This shade-tolerant bamboo species is especially favored in the region for eating as well as construction purposes. The domestic and foreign markets for both products are expanding. RFD research indicates that one family can manage five *rai* of sweet bamboo cultivation without any additional labor inputs. There is a strong need to identify more local income-generation opportunities in the forest through such small-scale cottage industries as sweet bamboo cultivation. As a prerequisite, training for shoot processing, basket-making, and other non-timber forest product processing would be required. Another recommendation for village income-generation involves cultivation in the natural forest of high-value ornamental plants such as orchids, although cur-

rent regional markets and linkages are inadequate. Unfortunately, without the legal backing of a supportive policy on community forest rights and usufruct tenure, enrichment planting in the reserve forest of Dong Yai remains an insecure venture—and hence a disincentive—in the minds of the villagers. To date, this may be the major reason why experimentation by the community with desired understory and associated species has not yet been initiated.

In an attempt to multiply the success of Dong Yai, over the past several years the *kamnan* has spoken with neighboring villagers about leaving a portion of their fields fallow and following the community protection model of Dong Yai to allow secondary succession of the natural forest. However, he has not been very successful. One of the reasons underscores the importance of land suitability and even slight variations in topography. Few of the neighboring villages possess elevated laterite tracts such as Dong Yai; while these are marginal for cash crops, they are ideal for natural forest regeneration. Currently it remains economical for other villages to continue to cultivate their lowland fields in agricultural crops. With no alternatives for production as the villagers wait for a forest to regenerate, the opportunity costs are too high. These farmers are forced to cultivate every tract of available land to ensure their daily survival.

### *Ecology and Economy*

Dong Yai is characterized by three distinct natural forest types: the dominant dry dipterocarp, covering about 75 percent; the dry evergreen forest (10 percent); and the riverine bamboo forest (5 percent). Recent research in the dry dipterocarp forest identified an average of sixty-one different tree species on a 10-*rai* plot (1.7 ha.). Some of the dominant species in this ecotype include *Dipterocarpus intricatus*, *tuberculatus*, *alatus*, and *obtusifolius*; *Shorea obtusa*; *Xylia* and *Canarium kerrii*; *Dialium cochinchinense*; *Anisoptera oblonga*; and *Sindora siamensis*. The preponderance of coppicing species in this forest type, comprising a significant 72 percent of the total (forty-four of the sixty-one species), indicates its high potential for natural regeneration if given adequate initial protection from biotic interference, including frequent fire.

In the dry evergreen forest, a transitional zone of higher rainfall and slightly lower elevation than the dry dipterocarp, the major species include *Peltophorum dasyrachis*; *Eugenia cumini*, *Shorea talura*, *Cratoxylon* spp.; *Castanopsis armata*; *Pterocarpus macrocarpus*; *Anisoptera oblonga*; *Dendrocalamus strictus*; *Canarium kerrii*; *Polyosma arguta*; *Morinda corea*;

*Mangifera indica*; and *Ficus spp.* Some 25 percent of the species of the dry dipterocarp overlap with the less species-diverse but denser (i.e., basal area and stem frequency) dry evergreen forest.

The villagers of Dong Yai, however, share a perspective which values the forest ecosystem far beyond its standing stock of trees. Recent research . . . exposing the high degrees of dependency of Dong Yai communities upon edible non-timber forest products (see case study, p. 20). Supplemented by rice and crops from small, individual homegardens, which typically produce 15–20 fruits and a similar variety of vegetables, the forest serves as a primary supermarket to the majority of resident families. Excluding rice, about 80 percent of the average Dong Yai household diet is derived from the forest. Families purchase very few foodstuffs in the marketplace, particularly during the biologically productive rainy season. Quantitative annual estimates in 1992 of food product extractions in Dong Yai include 260,000 kilograms of edible plants, 104,458 kilograms of mushrooms, and 17,676 kilograms of bamboo shoots.<sup>10</sup> Community interviews and field investigations have so far identified over fifty edible leafy plants, thirty mushroom species (ten with current commercial market value), eight tuber varieties, fifteen fruits, and over twenty-five different edible fauna (e.g., squirrels, birds, ant eggs, lizards, snakes, fish, turtles, beetles, locusts, and moths). Based on discussions with community informants, a seasonal calendar and transect of products by micro-ecological niche illustrate the seasonality of the forest production system and its impressive, multi-tiered floral and faunal diversity (see Figures 6 and 7).

Mushrooms are among the highest value and most important foods from Dong Yai. Every household is involved in mushroom collection for subsistence use, and the majority also for their sale. Studies of mushroom gathering and marketing indicate that each family can collect an average of one kilogram daily for fifteen days each month through the four months of abundance during the rainy season. On average, 70 percent is utilized for domestic consumption and 30 percent is sold at an average price of 25 baht per kilogram (see Figure 8). Over a four-month period a family can earn 450 baht (\$18) in the mushroom market. If the household opted to market its entire mushroom collection, provided the regional market could expand to absorb the increased supply, the four-month collection activity would generate 1,500 baht (\$60)—a significant percentage of an annual Dong Yai household income. Perhaps most important, from a nutritional standpoint, the

### ◆ Khun Prom Chaito: A Forest Product Gatherer

After capturing them with a net, Khun Prom Chaito skins, minces, and bakes her two favorite forest lizards, *yaa* and *kapom*, to provide a nutritious, high-protein meal for her family during the dry scarcity months of March and April. Alternately, Prom Chaito prepares another recipe in which the lizards are skinned and mixed raw with green mango and chili peppers. She accompanies the lizard salad with *mun saeng* tuber, a common tree-climber which is chopped, boiled with salt, and combined with coconut milk and sugar.

Prom Chaito is a typical daily gatherer of Dong Yai's diverse flora and fauna, especially lizards, mushrooms, fruits (e.g., *makok*, *samor*, and tamarind), leaves, bamboo shoots, ant eggs, night and water beetles, bullfrogs, and tubers. Her forest forays often result in the provision of two or three different dishes at each meal. In addition, she usually sells locally a portion (10-20 percent) of her variable collection to generate a small but steady household income. Prom Chaito estimates that in the course of the four-month rainy season she catches 800 frogs and sells 10 percent of them, earning 300-400 baht (\$12-16) in the season. She explains that water beetles, a tasty concoction if fried and then crushed in chili sauce, command a high price of 7 baht each in the Bangkok market, compared to only 2 baht locally. She feels that it would be a worthwhile strategy to develop a reliable market channel to Bangkok.

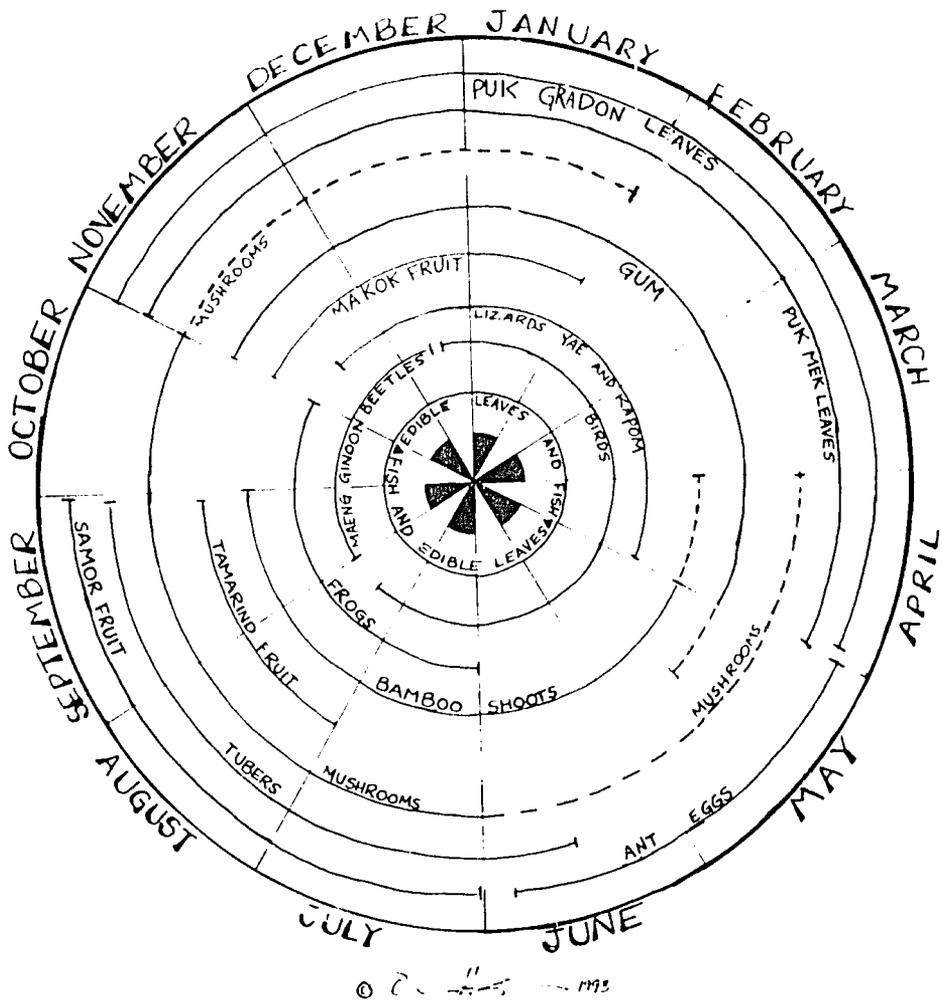
As she shreds the young leaves and shoots of *pak gadon* and *pak mek* (*Kalia arborea*) trees to mix into her green papaya salad, Prom Chaito explains that she and her husband migrated to Dong Yai from Sakon Nakhon. As a result, they did not "inherit" any particular forest patch to protect in Dong Yai. Nor was there any chance of "encroaching" on a tract due to the effective system of protection by community members. When rules for firewood cutting and extraction were tightened by community consensus in 1987, Prom Chaito adapted. Hoping to increase her fuelwood self-sufficiency, she voluntarily planted eucalyptus saplings, obtained from the RFD, on the bunds of her paddy fields.

Prom Chaito's knowledge and orientation toward collection and processing of a vast range of seasonal forest products exemplify reality for the majority of families living in Dong Yai. Strong dependencies on the forest for food and other valuable wood and non-timber products permeate daily lives and mold livelihood strategies. Prevalent among rural inhabitants throughout much of Thailand, this heavy reliance on the forest provides a powerful incentive for forest communities to establish locally relevant management systems which ensure them sustainable benefit flows from the forest.



Figure 6

Seasonal Calendar  
of Forest Products  
in Dong Yai



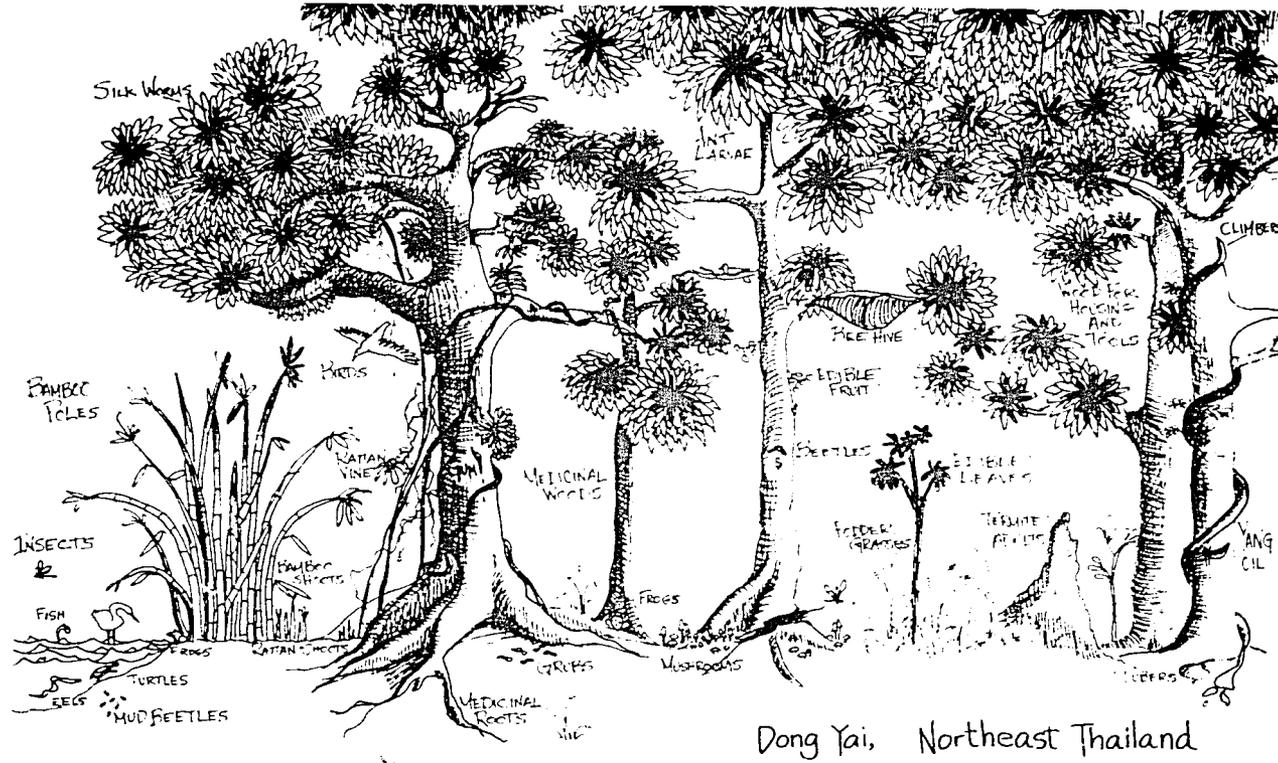
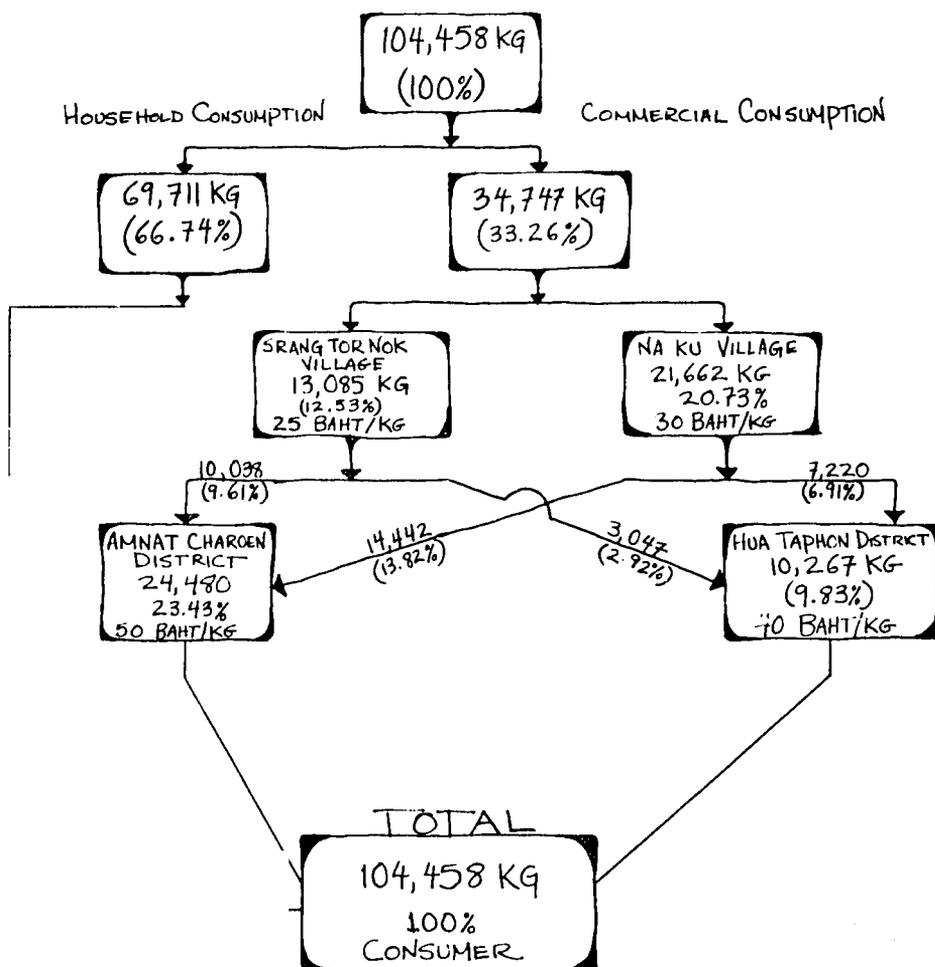


Figure 7

Sources of Forest Products in Dry Dipterocarp Forest

Figure 8

## MUSHROOM MARKETING CHANNELS IN DONG YAI



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daily diet of the families of Dong Yai benefits for over one-third of the year from a renewable, high-protein forest food which they would not otherwise purchase given their low incomes.

When asked what benefits she obtains from the Dong Yai forest, sixty-year old Prom Chomchai smiles and reports three: rainfall, food, and gum. Producer of the most valued of the forest's gums, the *Shorea obtusa* is one of the dominant canopy trees in the dry dipterocarp forest. While a variety of resins and gums can be extracted from a host of other tree species, the villagers most highly prize the *Shorea's* gum exudate for use in caulking, boats, bamboo basket-making, and general repairs. Traditional preparation and application of the gum also depends upon another tree, the *Dipterocarpus alatus*, which yields an oil called *yang* that is mixed with the crushed gum to lend pliability. The *yang* oil is extracted by excision and burning, a process which is frequently harmful to the tree if not collected and monitored with care. As a substitute for *yang* oil, seventy-five-year-old informant Rupsai explains that villagers today may use more readily available diesel oil, which offers similar quality to *yang* but costs 5 baht less at 7 baht per kilogram.

The gum collection season in Dong Yai begins in November and lasts six months, extending through part of the dry season. The seasonality of the product is significant, as steady gum flows during the dry season (March and April) can help compensate communities for the much lower availability of other economic and subsistence non-timber forest products in this period (see Figure 6).

In the communities of Dong Yai, the task of gum collection tends to rest with the older people, assisted by younger children who are not attending school. Nearly every family in Prom Chomchai's village is involved in the activity, about half for domestic consumption and the other half for commercial sale. Prom Chomchai herself ventures daily into the forest at 6:00 A.M. with the family's two cattle, her four grandchildren, and a bamboo gum stick. The job of collection is time-consuming and often demands up to eight hours a day in the forest. Prom Chomchai explains that fortunately for herself and other collectors in neighboring villages, because the forest is so accessible, she can return home at mid-day for a break before resuming activities in the afternoon.

Numerous gum collection techniques are employed. The simplest involves collecting the fallen, hardened resin at the base of the tree. Other methods require incising the upper trunk of the *Shorea* using a bamboo stick with a sharpened tip, or enlisting children to climb the trees to collect from natural or man-made wounds. While the gum

collection activity is labor-intensive, two factors lower its opportunity costs. First, the work is typically combined with the duty of grazing the household's livestock in the forest. Second, the majority of gum collectors are older, retired men and women who can no longer work in the fields or participate in other off-farm employment. Hence, the activity offers employment to the elder sector of the population, keeping them productively engaged while also generating a substantial supplement to the household income.

On average, a typical family unit of collectors can gather two kilograms of gum daily. However, during the high season productivity can flourish, and an enthusiastic male collector might gather up to ten kilograms per day. In Prom Chomchai's village, an agent visits every other day to purchase the unprocessed gum from the collectors. Prom Chomchai earns 7 baht per kilogram. The gum is further sold to a local retailer at a profit margin of 2 baht per kilogram. In a six-day week, Prom Chomchai can earn a steady income of 84 baht—or 336 baht (\$14) every month. In terms of comparative value, only a few other non-timber forest products, such as mushrooms, offer a higher local market price per kilogram. However, Prom Chomchai points out important differences between these two forest products. Mushrooms are generally abundant only during and just after the rainy season, a period when a maximum number of other edible plants and non-timber forest products are also available. Gum, in contrast, can provide cash benefits during more crucial times of scarcity in the dry season. Even more significant in Dong Yai's case is the current resource supply and demand situation. Prom Chomchai claims that even during the peak rainy season, the availability of forest mushrooms has been steadily declining. With a subtle touch of disapproval, she describes how many villagers from far away, sometimes up to fifty kilometers, travel to Dong Yai to collect the coveted mushrooms. On the other hand, the supply of gum does not appear to be suffering from the same pattern of over-exploitation and decline, perhaps because of its requisite labor demands. Whether the gap in the supply and demand of mushrooms can be closed over the coming years will largely depend on the community's management response to a growing access control problem. Because the heavy socioeconomic reliance of Dong Yai communities on valuable forest products will clearly persist into the future, a closely managed balance between conservation and extractive activities must be achieved among users.

## **Reflections**

Exemplary leadership and coordination from the Tambon Council, combined with cooperation among the regional RFD field staff, Kasetsart researchers, and village elders, have coalesced to inspire a voluntary spirit of communal concern and initiative among Dong Yai's villagers. After almost thirty years of regeneration, most of the former kenaf fields are covered with 30–45-foot tall, biologically diverse dipterocarp forest. The Dong Yai forest tract is well protected against fire and illegal timber harvesting by twelve highly motivated Forest Protector Groups, who share a strong stake in sustainable production and benefit-sharing. Based on the Dong Yai experience, degraded forests in Northeast Thailand which still retain some amount of remaining rootstock seem to be capable of rapid natural regeneration. Even more important, forest-dependent communities are often competent and eager to play a role as local protectors and co-managers.

Among the perceived benefits of the Dong Yai forest to the villagers that protect it, sixty-two-year old Punja Tanamcha notes increased rainfall and fewer droughts, mushrooms and plenty of food, timber and fuelwood, and community pride in the forest. A renewed sense of confidence, empowerment, and self-reliance in forest management underlies the community's pride. At the same time, the emerging, newly oriented role of forestry officials toward the community protection groups is described by the *kamnan* as "educational and supportive."

The forest management situation in Dong Yai is unique in certain aspects and representative in others. Thirty years ago, regional market prices and specific agroclimatic factors led Dong Yai farmers to abandon their kenaf fields for more economical lowland cultivation. The field fallow and forest regeneration process which followed was facilitated by other specific factors: the reserve forest designation of Dong Yai; an agency logging ban in the area; a united and supportive Tambon Council, which inspired organized cooperation by Dong Yai community groups; an open-minded approach and concerted effort on the part of the local RFD staff to unofficially share responsibilities and benefits with the communities; the involvement of committed Kasetsart University researchers in helping to better understand the socio-ecological context and needs of Dong Yai villagers; and the joint effort by RFD and Kasetsart professionals to provide technical training, management assistance, and moral support to the communities. One of the most important lessons of Dong Yai is the proven capacity of villagers to organize, cooperate among themselves in protection, and collaborate as

allies with the RFD to devise a sound forest management system which can sustainably ensure benefits of environmental products and services to the local population.

While case-specific details have been presented here, much of the learning from Dong Yai's success is being confirmed more generally as similar patterns emerge across a wide range of cultural and ecological contexts throughout South and Southeast Asia. Given the proper attitudes, a supportive climate, and flexible operational approaches to forest communities as co-equal, joint-management partners—including the assurance of authority in decision-making and rights to forest benefits—many rural communities will respond positively as forest protectors and managers. In particular, communities with historically strong economic and cultural ties to the forest embody a wealth of indigenous knowledge concerning the forest's dynamic ecology and biodiversity. Their high forest dependencies are a compelling motivation to reverse forest degradation, enhance biomass productivity, and ensure sustainable benefits by means of controls on access and harvesting practices.

Even while Thailand's national forest policy does not yet provide official support to such communities as Dong Yai, grass-roots initiatives have forged ahead. New relationships have developed as local forestry staff, diagnostic researchers, and concerned communities unite as collaborators and allies in the common cause of participatory forest management. This pattern of activism by local communities, asserting responsibility for their forest resources in the face of scarcity and threats from outsiders, is now widespread through Asia. When enough grass-roots success stories of community participation such as Dong Yai have been documented, communicated, and advocated at the highest political levels, the Thai government will come under increasing pressure to respond with supportive legislation. This will help further facilitate and legitimize the local empowerment processes which are necessary to ensure organizational sustainability. In turn, those thousands of community systems of natural forest management already underway in Thailand will be strengthened, while new communities will be encouraged to develop their own, locally adapted institutional strategies to stabilize and regenerate their forest lands.

## NO CHAINSAWS IN NAM SA

"Before this program began, forest use in the watershed was out of control."

-"Uncle" Chan, Karen hill farmer in Nam Sa, December 1992

### *Introduction*

After a lengthy debate at a recent meeting of the Nam Sa sub-watershed Network forum, community representatives decided to ban chainsaws in their forested homeland. Only a single village out of ten member villages contested the idea. This decision illustrates just one of many deliberations and outcomes of a three-year-old program to establish community controls over the rich forest ecosystems that have been rapidly disappearing in the Sam Mun mountains, seventy-five kilometers northwest of Chiang Mai in Northern Thailand (see Figure 2).

The northern watersheds of Thailand play an important role in supplying water to the nation's central rice bowl. Planners have been concerned that the hydrological function of these critical watersheds, with the second highest regional rate of deforestation, are being undermined. Similar to the Northeast, the forests of the North have been under growing use pressures from lowland populations migrating into the upper watersheds. However, unlike the Northeast, a steady stream of hill tribes has also migrated into the highlands to practice shifting agriculture. In recent decades, political instability in Laos and Burma has increased the flow of highland tribal people. While many of these hill tribe communities have been engaged in opium cultivation, foreign governments and international agencies have placed strong pressure on the Thai government to control production. Numerous crop substitution programs and resettlement schemes have been implemented since the 1980s, showing some success in decreasing opium growing and responding to the needs of highland tribals. However, the midland tribals, among the poorest in the region, have been relatively ignored. Furthermore, given serious upland deforestation and associated environmental deterioration, the fundamental problems of sustained productivity persist.

Based on the urgency of protecting the upper watersheds of the Northern region and the relative failure of programs to reverse the processes of deforestation, until recently the government has emphasized resettlement of midland and highland tribal people outside areas

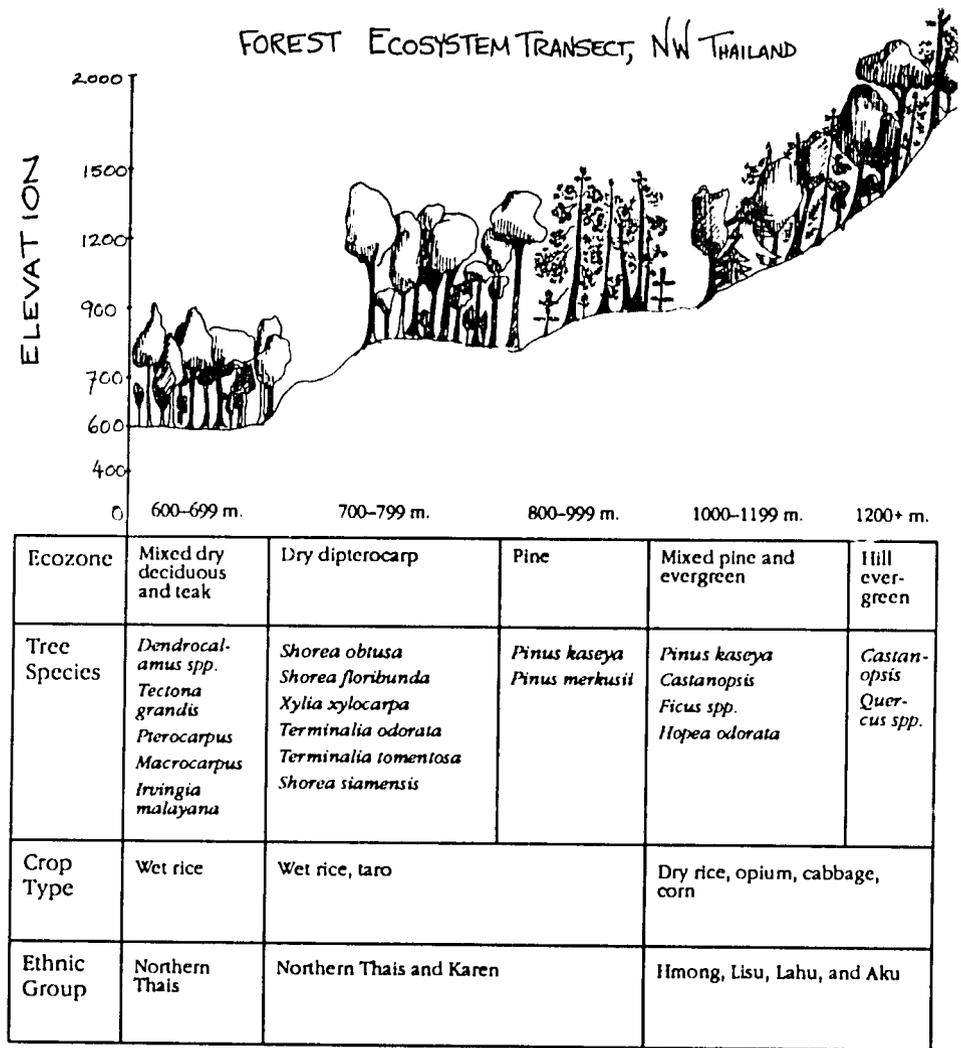
designated as national parks, wildlife sanctuaries, or Class 1 watersheds (STK program). However, resettlement has not proceeded on a broad scale due to community protests and limitations on available land for relocation outside the steep watershed areas. The case of Nam Sa offers an alternative to resettlement, illustrating an opportunity for government to forge partnerships with local communities to protect critical watersheds and important forest resources without disrupting local settlement patterns. The Office of the Prime Minister and the RFD have recently initiated a Northern Watershed Rehabilitation Program, which might draw upon the significant experience of Nam Sa and extend its forest stabilization strategies through much of the upper North region.

### *Background*

The 2,000 square kilometers that encompass the Sam Mun watershed area are inhabited by sixty ethnically diverse village hamlets of Karen, Lisu, Akha, Hmong, Unannese, and local Thai-speaking peoples. The communities are interspersed amid the Sam Mun mountains, a rugged range of ridgetops and narrow valleys which fluctuates from 700 to 2,000 meters above sea level. Although the villages are economically poor, they have been blessed with abundant natural resources, including some of the Kingdom's most majestic mountain forests. Loamy soils underlain with granite and limestone support a range of forest ecosystem types, varying from dry deciduous and teak to towering dipterocarp giants, pine, and hill evergreen forest (see Figure 9). The area receives about 1,700 millimeters of rainfall annually. Characteristic of Northern Thailand's hill region, the ethnolinguistic diversity is mirrored in the different farming systems practiced in the region.

Based on estimates in 1987 that 800 hectares of the 2,000-square-kilometer Sam Mun watershed was under opium production—yielding 15–20 metric tons of raw opium annually—the watershed was targeted by Thailand's Narcotics Control Board and the UN Fund for Drug Control. Among the sixty hamlets in the watershed, it is primarily the highland Hmong, Lisu, and Akha who have engaged in opium cultivation. However, in coordination with the RFD as lead agency, project planners realized that the problems of the region were not simply ones of opium production. Over the past twenty years, this once remote area has been shaken by war on the Burmese border, opium trafficking, commercial logging, in-migration, and the commercialization of agricultural systems. These changes have resulted in steady deforestation,

Figure 9



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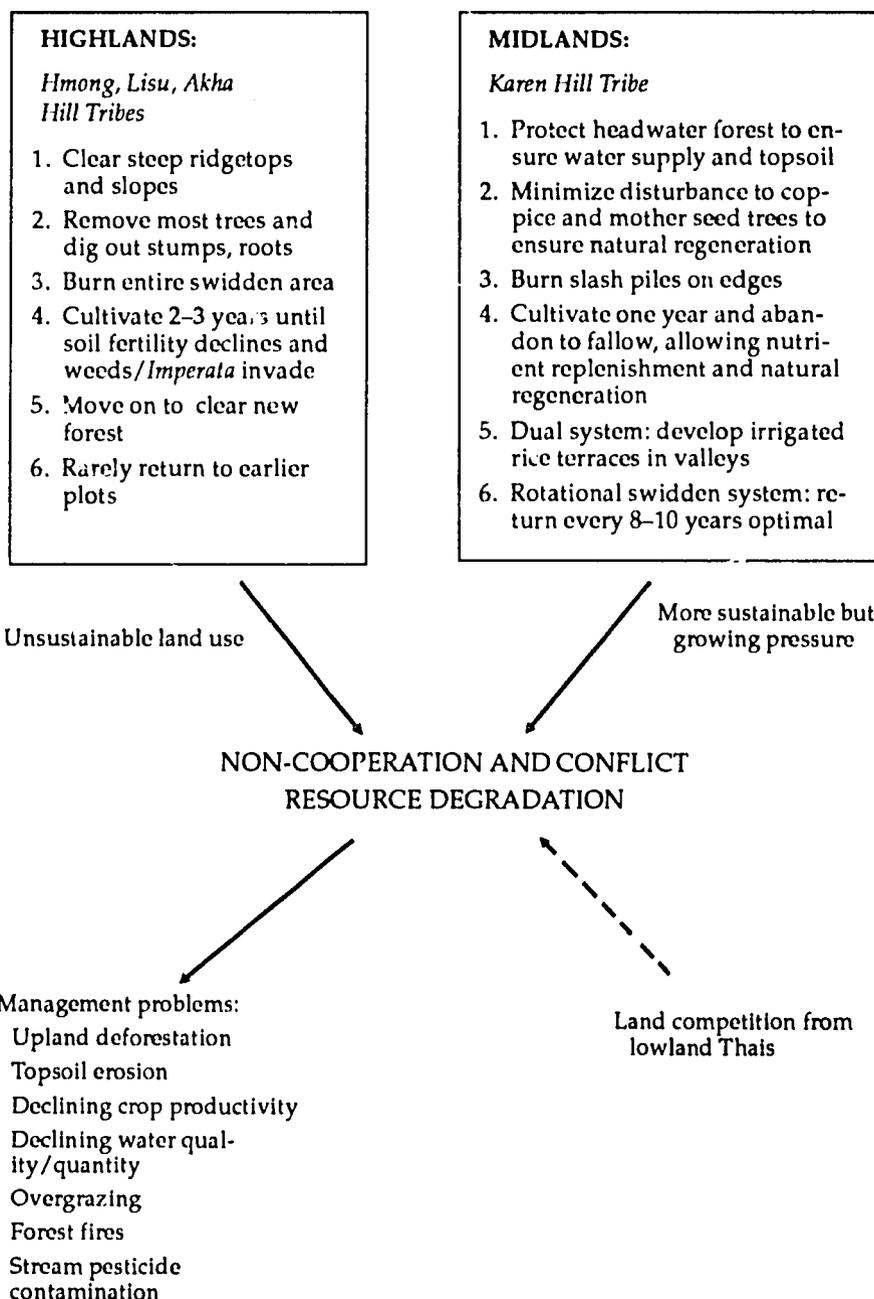
severe soil erosion, and periodic fires which have rapidly destroyed the environmental stability and productivity of the uplands. Programs to simply generate more cash would hardly help wean villagers away from opium cultivation if they were unable to stabilize their natural environment in the transition.

Beginning in 1986, collaborative field studies sponsored by the Ford Foundation were undertaken by social scientists at Chiang Mai University (CMU) and RFD program officers. The work helped to identify important conflicts between the highland opium-cultivating communities and the midland Karen and lowland Thais. One of the findings confirmed research conducted over the past decade which documented differences in shifting cultivation strategies among hill tribes. The upland tribes practice a form of swidden cultivation involving the clearing of steep, erosion-prone ridgetops and exposed upper slopes which have good sunlight and drainage. The communities remove most of the trees, dig out rootstock and stumps, and burn the entire swidden area. They then farm these fields for 2–3 years or until the soil's fertility is badly depleted and weeds such as *Imperata* grass invade. Abandoning the plots in an ecologically disturbed, inhibited state of succession, upland tribals rarely attempt to return one day to reutilize them. Instead they move on to clear new vulnerable uplands, repeating the process of forest overexploitation, degradation, and conversion to grassland.

In contrast to the often unsustainable land-use system practiced by the more recent migrant highlanders, the midland Karen—some settled for over a century—adopt a dual production system. Both shifting and sedentary, the system combines midland swidden with lowland irrigated paddy farming. First, the Karen protect headwater forest to ensure topsoil stability and a consistent supply of water to their lowland paddy fields. In swidden field preparation, they take care to minimize disruption by burning on field edges and leaving coppicers and mother seed trees in an effort to ensure natural forest regeneration. The Karen rarely cultivate a field for more than one year. Thus forest regrowth is often rapid, sufficiently rejuvenating soil fertility so that the newly regenerated forest can be cleared again after 8–10 years of fallow. The Karen move less frequently than the highland tribes due to their permanent lowland paddy in the valley bottoms and tendency to return periodically to farm old swidden fallows again. Their less land-extensive, rotational swidden systems have historically proven ecologically sustainable (see Figure 10).

Figure 10

DIFFERENCES IN SHIFTING CULTIVATION STRATEGIES, NORTH THAILAND



The highlanders' swidden practices have subjected the Karen to the negative downstream impacts of forest degradation, often bringing them into conflict with upland tribal groups. The Karen are also being squeezed from below due to increasing pressure from lowland Thais who migrate into the watershed and compete for irrigated rice lands. At the same time, none of these communities has had any legal resident authority or rights over the forest resources of the watershed since the area is formally designated Reserve Forest Class 1 Watershed under the jurisdiction of the RFD.

### *Project History*

The Sam Mun watershed project strategy adopted an unusual approach by deciding that communities must be given rights and responsibilities to effectively stabilize and manage the forest environment. The CMU-RFD collaborative experiment in Nam Sa subwatershed of the Sam Mun began the initial testing of this unconventional strategy.

Nam Sa is one of the subwatershed areas located in the Pai watershed of Mae Hong Sorn Province, draining into Burma's Salween River. The Nam Sa subwatershed encompasses five distinct microwatersheds, each an average of 20–30 square kilometers (see Figure 11). Nam Sa is inhabited by 10 hamlets (*muban*) of Karen, Hmong, and Lisu hill tribes. In each microwatershed there are 1–3 hamlets, each comprised of 35–50 households, for a total population of 2,000 people (see Figure 12). The Hmong and Lisu reside in the uppermost reaches of the watercourses.

A small dirt road built in 1985 winds its way over the ridgetops and along the valleys, connecting a few of these communities to the outside world. Log bridges criss-cross the many perennial streams that drain the subwatershed. Local communities selected their village sites and names based on the five streams that drain the Nam Sa (e.g., Huai village is located next to the Huai Dua stream). The project team felt it might help communities protect and manage their entire subwatershed if the larger geographical area were clearly demarcated by smaller tributary microwatersheds, hydrological units with which the hill tribes were already familiar.

Recruited early in the project in 1987–88 to work as community extensionists, two young community organizers (COs) took up residence in the Nam Sa subwatershed. They began visiting the settlements to discuss conflicts, communication difficulties, and resource manage-

# COMMUNITY MANAGEMENT BY WATERSHED DEVELOPMENT UNIT SAM MUN MOUNTAINS, N. THAILAND

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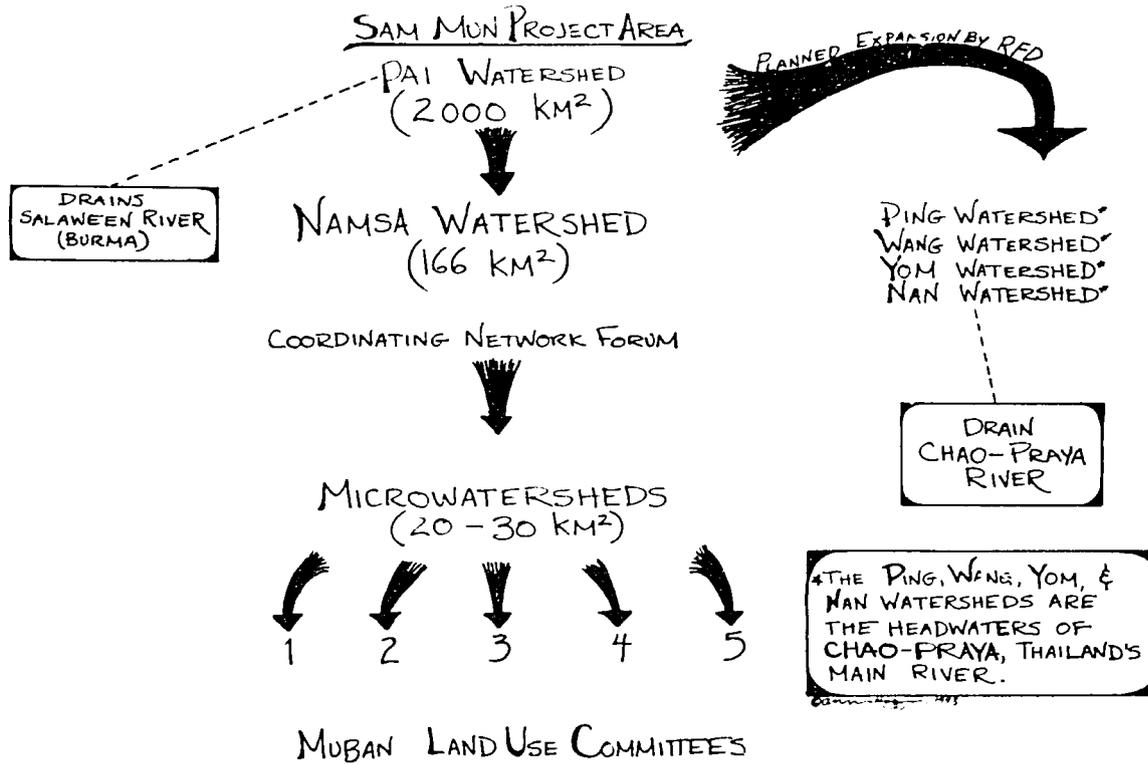
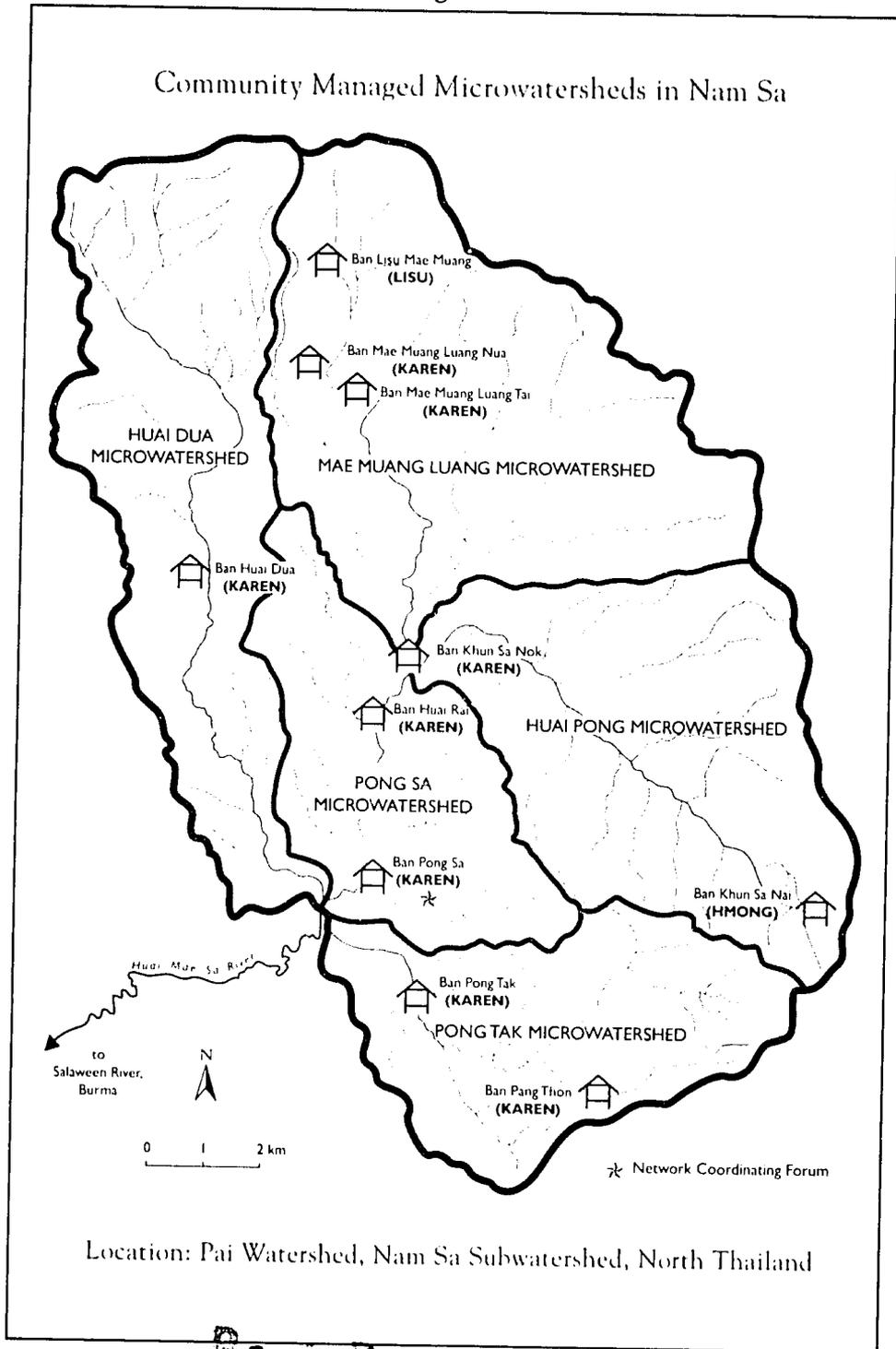


Figure 11

Figure 12



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ment needs. In a gradual and painstaking process, it took two years for the COs to succeed in transforming the initial relationship of skepticism and distrust toward them to one of trust and mutual rapport with villages historically isolated from any outside intervention. Only then could the organizers move into serious discussions of watershed management by encouraging communities to organize and actively participate in protection and coordination of land- and water-use decisions (see case study, p. 37).

From its inception, another important feature of the project has been the institutional mechanism of monthly “Working Group” meetings. On the program level, the Working Group effectively coordinates and systematically monitors the roles of key project collaborators at all levels, from the field to the central forest office. Meetings are conducted to review field research findings, adjust the program accordingly, assess indicators of progress and failure, and draft monthly workplans by designating specific responsibilities to project staff (see Figure 13).

At the field level, project officers determined that the villagers might be most successful if they conducted microwatershed planning through village (*muban*) committees, while also developing a subwatershed Network forum to coordinate intervillage decisions and management activities among the ten *mubans*. The primary role of the COs has been to assist the hamlets in establishing Muban Land-Use Committees and a subwatershed Network coordinating forum comprised of elected village representatives.

Among the first activities undertaken jointly by the COs and communities was the construction of large, three-dimensional maps based on information from topographical maps and aerial photographs. Khun Rath, the *kamnan* of the subdistrict, notes that in his village of Pong Sa, the COs taught community members not only how to construct a three-dimensional map of their microwatershed, but also how to utilize the information. Constructed on a scale of 1:5,000, each map took 2–3 weeks of community work—cutting, stacking, and painting raised cardboard with different colors to indicate ridge and valley boundaries, fields, forests, and streams. Initially, villagers had some difficulty orienting to the topographic maps. This changed as they worked on the watershed model, gaining experience and confidence in map interpretation.

The interactive process of creating the three-dimensional maps led to numerous discussions of resource use in the subwatershed and helped the community focus its attention on the spatial location of

◆

### Yan Yong: A Community Organizer's Challenge

A twenty-nine-year-old graduate of agriculture, Yan Yong was hired four years ago by the RFD as a community organizer (CO) for the Sam Mun project. His mandate was to help the villages in the subwatershed develop a participatory resource management system. After two months of training by social scientists at CMU and by RFD staff, he was assigned to Nam Sa with one other CO. Yan Yong recalls his struggle in the first half year in the field:

The villagers did not trust me and were reluctant to speak. Earlier, when the foresters had attempted to reforest degraded grasslands, the villagers would pull out the seedlings. All I could do was to keep talking with them about their lives and problems. Traveling among my three villages, eating and living with the families, I was trying to build trust and to respond to their fears and needs.

Two years later, he climbed to the top of the ridge with a group from the village and began discussing land-use problems, pointing out the visible ecological differences between conservation farming practices and unsustainable swidden systems. This was Yan Yong's first breakthrough and a turning point in the development of a new relationship between the RFD and the community.

As a CO, he feels that his most important role is sensitizing the community to resource management problems and potential strategies to resolve them. By helping establish a Network forum for discussion in Pong Sa, Yan Yong has tried to create opportunities for intervillage cooperation and exchange. The main resource management issues in the subwatershed involve the shifting from upper catchment swidden fields to permanent farms in the lowlands. According to Yan Yong, about 80 percent of the households are in the process of shifting, while 20 percent are cultivating their highland swiddens for another year during the time-consuming process of constructing terraces and irrigation channels for their lowland fields. The preparation of rainfed fields also takes longer because they now are planted along the contour to minimize erosion. Community members, especially the Karen, are assisting upland groups in the transition process. Land-Use Committee members are also working avidly to tackle the pesticide problem. The owner of a pesticide manufacturing company strongly influenced farmer attitudes by writing a letter to the newspaper just prior to his death apologizing to communities for the problems his product (Gummoxone) had caused. As evidence of fishkills from stream contamination mounts, more farmers are practicing organic pest control measures.

Yan Yong recalls the early efforts he made in urging the villages to conduct systematic monthly meetings to discuss resource use needs and management options. Today, he reports that the Muban Committees and Network forum have become institutionalized and self-reliant. He now can stand outside the meeting hall and simply monitor the discussions. Taking responsibility for their own future, the villagers are becoming more confident and empowered to solve by consensus their resource management problems.

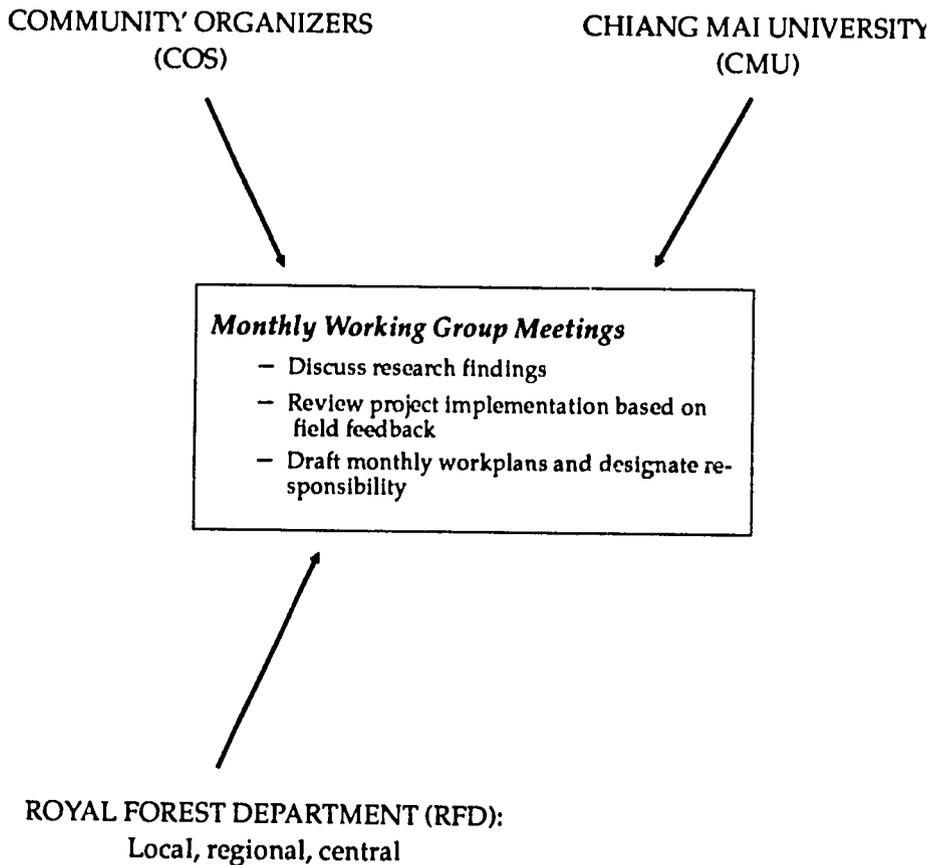


Figure 13

**THAILAND UPLAND SOCIAL FORESTRY PILOT PROJECT:  
WORKING GROUP STRUCTURE**

**OBJECTIVE:** RFD-COMMUNITY-CMU collaboration to develop participatory land-use management plans

**STRATEGY:** Learning process approach centered on village community organizers and Working Group structure



problems and management options. The maps have cultivated a keen sense of ownership, interest, and responsibility among the village members, assisting them in visually understanding the upstream-downstream river linkages and serving as discussion tools for land-use planning at monthly meetings. With the maps as reference points, local land-use management plans have been developed for each microwatershed. Reaching a consensus on a new management plan generally takes Muban Committees 2–6 months. Detailed sets of management rules and regulations to implement the plans have also been developed by the village committees, although changes and refinement of the regulations are an ongoing process.

### *Land-Use Transitions*

Interdisciplinary diagnostic research, combined with the RFD's extension activities through the COs, has led to improved understanding of the subwatershed's major resource management issues and of community strategies to address them (see Figure 14). One of the major land-use changes promoted by the RFD and COs has been to encourage highland villages to abandon ridgetop and upper slope opium and rice cultivation and to shift their homes and fields to the mid- and lowlands. Offering interagency technical assistance, the initiative is helping upland communities construct terraced, irrigated rice fields along the bottoms of the tributary stream valleys. The UN Fund for Drug Control program contributes a financial incentive of 500 baht (\$20) for each *rai* of irrigated rice land created, to be deposited into the *muban* development fund. However, the idea of moving downslope was initially rejected by the Hmong village of Khun Sa Nai. Reluctant community members were inexperienced with wet rice cultivation and did not wish to move their traditional homes. Eventually, with the guidance of the COs, a compromise solution was reached. The Hmong agreed to shift their fields downslope in exchange for maintaining their ridgetop home settlements.

After gaining assistance from the RFD and the midland Karen, who understand well the ecological benefits if they cooperate, the Hmong have replanted their upland fields with fruit trees, which they are now protecting. They are currently constructing terraced fields and building diversion dams and canals to their new irrigated paddy lands. In anticipation of a shift downslope, the Lisu village is also preparing lowland rice fields situated two hours from their homes. An RFD project officer predicts that the complete transition of highland field culti-

Figure 14

MANAGEMENT ISSUES IN NAM SA

<i>Problem</i>	<i>Strategy</i>
1. Upland deforestation	<ul style="list-style-type: none"> <li>- No clearing steep slopes or ridgetops</li> <li>- Agroforestry, reforestation</li> <li>- Protection to enhance natural regeneration</li> <li>- Shift ridge and upland swidden to lower lands</li> <li>- Ban chainsaws</li> </ul>
2. Soil erosion	<ul style="list-style-type: none"> <li>- Soil and water conservation practices (e.g., terracing, agroforestry, alley cropping, mulching, vegetative bunding, contour farming)</li> </ul>
3. Declining agricultural yields	<ul style="list-style-type: none"> <li>- Shift upland fields downslope</li> <li>- Contour farming, terracing, crop rotation</li> <li>- Irrigation</li> <li>- Decrease pesticide use</li> </ul>
4. Decline in water quality and quantity	<ul style="list-style-type: none"> <li>- Strict headwater forest protection</li> <li>- Natural forest regeneration and reforestation/agroforestry</li> <li>- Soil and water conservation techniques</li> <li>- Minimize upland grazing pressure</li> <li>- Reduce pesticides</li> </ul>
5. Chemical pollution in streams (pesticides, fertilizer)	<ul style="list-style-type: none"> <li>- Reduce pesticide use and substitute natural biocides</li> <li>- Adopt organic farming with integrated pest management techniques</li> <li>- Plant mixed tree crops, including nitrogen-fixing species</li> <li>- Reduce chemical fertilizer, use green manure</li> </ul>
6. Forest fires	<ul style="list-style-type: none"> <li>- Voluntary community patrols, increase in dry season</li> <li>- Firebreaks around fields, fines for escape from swidden</li> </ul>
7. Overgrazing and livestock crop damage	<ul style="list-style-type: none"> <li>- Ban free "open access" grazing, adopt stall feeding</li> <li>- Fencing of ecologically vulnerable areas</li> <li>- Regulate rotational grazing</li> </ul>

vation to lower lands in Nam Sa will require another two years. The availability of adequate favorable lands for these shifts and land conversions to lowland irrigated paddy has undoubtedly been a decisive factor in the progress. Meanwhile, the hill tribes are working with the RFD to turn their former ridgetop and upper slope fields into mixed agroforestry plots. In areas where *Imperata* grass has not taken hold, good natural forest regeneration is underway (see Figure 15).

One of the major problems faced by upland communities undertaking this shift in land-use and production systems is the loss of income in moving away from opium cultivation and (in some cases) cabbage. Opium currently brings 10,000 baht (\$416) per *joy* (1 *joy* = 1.6 kg.), and most fields yield 2–3 *joy* per *rai*. This means that a six-*rai* plot can generate up to 180,000 baht (\$7,500). However, apart from powerful economic incentives, a number of disincentives to opium cultivation have mounted over recent years. Since opium-growing is illegal and subject to police raids, farmers must find isolated locations for cultivation and risk the chances of crop destruction and arrest. As Nam Sa was opened up to the outside world by the road in 1985 and the UN crop eradication program was initiated in 1987, these risks have grown. Furthermore, the entire subwatershed is designated reserve forest, and the hill tribes understand the basic tenure insecurity this implies. Should they choose not to cooperate, the villagers fear they may face total dislocation, a policy vigorously pursued until recently by the government in the North and Northeast with the Khor Jhor Khor forest resettlement program. Interestingly, despite the transition away from opium, it is estimated that the average annual household income in Nam Sa increased from \$250 in 1987 to \$600 in 1992.<sup>11</sup> This increase in income has resulted in part from private sector involvement in marketing and production improvements for cash crops and livestock. Nam Sa leaders today report that no opium has been cultivated in the subwatershed since 1990.

Cabbage has also been an attractive commercial crop, and its intensive cultivation has been encouraged by certain agencies as a substitute for opium. While input costs for seed, fertilizer, and pesticides are high, cabbage can generate 20,000 baht or more per *rai* (\$4,800 per hectare). However, farmers in Nam Sa have become increasingly alarmed over the dangers of heavy pesticide application, which the crop seems to require. In response to a series of fishkills from stream contamination, community committee members are now pressuring farmers to reduce pesticide use in cabbage cultivation.

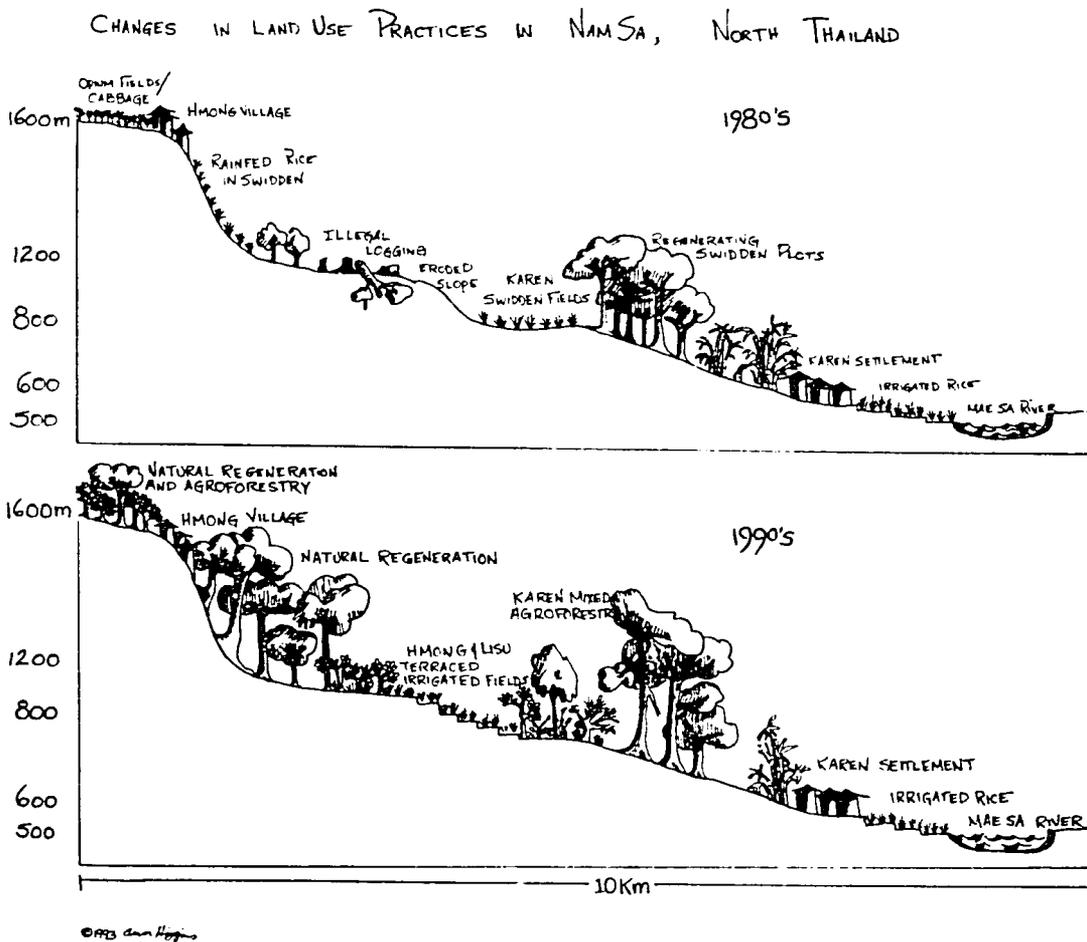


Figure 15

Forest products continue to provide an important source of supplemental food and medicine for the communities of Nam Sa. A wide variety of forest leaves, shoots, roots, fruits, seeds, and fungi, as well as insects and small animals, are collected for food. Villagers also earn income by collecting and selling wild orchids, rattan and bamboo shoots, honey, bamboo, worm larvae, hornets, and a number of mushroom species. In Pong Sa, Karen villagers have underplanted over 10,000 seedlings of edible rattan in the primary and secondary forests to supplement shoot availability and enhance their forest-based income. Collected in the forest, the seeds are propagated in the village and then outplanted in the forest understory.

### ***Muban Committees***

With ninety-eight households, Pong Sa is the subdistrict headquarters and comprises the largest village in Nam Sa. It has its own Muban Land-Use Committee and also serves as the subwatershed's Network coordinating forum, holding monthly meetings for village committee representatives and community members. Normally, 50–60 people attend forum meetings, including 2–3 representatives from each Muban Committee.

One of the early decisions of the Pong Sa Muban Committee was to place all the forest lands on the steeper eastern slopes of its microwatershed under strict protection. After identifying the location of their agricultural lands using the three-dimensional map, the group concluded that the eastern slope forest was the most strategic area for protection to ensure a steady water supply. The Pong Sa committee is responsible for patrolling and protecting a total area of approximately 1,500 *rai* (or 250 hectares) of forest drained by two small streams in its microwatershed. The neighboring microwatershed is patrolled by a nearby Karen village, Huai Rai (see Figure 12). Members from the community patrol on a daily rotational basis.

A team of 2–3 men generally assumes patrol duty. The patrol typically climbs to the top of the hill and walks the ridgeline to survey activities in the demarcated forest area. Patrol duties are organized by dividing responsibility among the five residential clusters (*yom ban*) in the village. The cluster chief (*hua na yom ban*) is responsible for assigning duties to the voluntary male members of the hamlet. Each residential cluster patrols for six days before passing the responsibility on to the next cluster. During the dry fire season, as many as ten people may be enlisted to monitor and extinguish spot fires. Typically set by outside

hunters or swidden cultivators who accidentally allow their plot burns to escape, fires are a major threat to the forest slopes.

The Pong Sa Muban Committee has formulated an elaborate system of rules and regulations to govern communal resource use. These have been developed through community discussion, debate, and consensus and are tacitly supported by the RFD field officers (see Figure 16). Most of the regulations adopted by the committee have been discussed at the Network forum and adopted in similar form by the other nine village committees. For example, in a series of three meetings held between December 1991 and February 1992, it was decided that agriculture should be banned on ridgetops and steep slopes, allowing such lands to either naturally regenerate into forest or be reforested with fruit trees. The Network forum agreed that upland farmers would need assistance in identifying fields on more gradual slopes for dry crops and that contour planting and other soil conservation measures should be adopted. They further decided to help these farmers, especially Hmong and Lisu, develop terraced, irrigated rice fields in the lower valley. As a result, the clearing of primary forest or steep slopes or ridges is prohibited by the community, while permission for opening older secondary forest plots depends on the quality of forest regrowth and slope erosion potential. Generally, forest areas that have regenerated well, or which have sharp inclines and are playing a fundamental conservation role, are banned from conversion to agriculture.

Each Muban Committee is responsible for allocating agricultural plots to households. The family who clears the land holds usufruct rights as long as it utilizes that land. If a family abandons the land for more than two consecutive years, the committee has the right to transfer the usufruct to another household who needs additional land. Farmers are required to dig fire breaks before burning off new fields. If a farmer permits his fire to escape, he is subject to a fine of 2,000 baht (\$83) for each *rai* damaged. Families that require timber for house construction or domestic repairs must submit a request before the community headman, and a written approval is necessary from the village committee before any felling is carried out. If a villager cuts a tree in Pong Sa without permission, he can be fined 1,000 baht (\$42) per tree; if any tree is cut for sale purposes, the fine jumps to 3,000 baht (\$125). Generally, first-time offenders are warned, and very few fines have been levied. However, recently a villager was charged 6,000 baht (\$250) for allowing his fire to escape and burn his neighbor's mango orchard.

Figure 16

- RULES AND REGULATIONS OF PONG SA LAND USE COMMITTEE**  
COMMUNITY MANAGED MICROWATERSHED FOREST  
1500 Rai
1. ALL STEEP LANDS ON EASTERN SIDE OF SUBWATERSHED UNDER STRICT PROTECTION AND PATROL.
  2. RESIDENTIAL CLUSTER CHIEF TO ASSIGN (AINCL) DUTIES TO MUU/MOBAN MEMBERS
  3. NO CLEARING OF PRIMARY FOREST; STEEP SLOPES, OR RIDGETOPS
  4. NO CLEARING OUTSIDE MOBAN'S DEMARCATED MICROWATERSHED AREA
  5. CLEARANCE OF NON-AGRICULTURAL LAND REQUIRES COMMITTEE APPROVAL
  6. AGRICULTURAL LAND ALLOCATED TO HOUSEHOLDS BY COMMITTEE
  7. HOUSEHOLD WHICH CLEARS LAND HOLDS (SUBTRACT) RIGHTS
  8. IF HOUSEHOLD ABANDONS FIELDS FOR 2 YEARS, COMMITTEE TO REALLOCATE LAND TO ANOTHER HOUSEHOLD
  9. FARMERS TO ADOPT CONTOUR PLANTING AND OTHER SOIL/WATER CONSERVATION TECHNIQUES
  10. FARMERS TO DIG FIRE BREAKS AROUND FIELDS AND FINE 2,000 BAH/RAI IF FIRE ESCAPES
  11. EXTRACTION OF TIMBER FOR DOMESTIC PURPOSES REQUIRES PERMISSION OF HEADMAN AND APPROVAL OF COMMITTEE; ILLLEGAL FELLING WITHOUT PERMIT FINE 1,000 BAH/TREE
  12. NO TREE FELLING FOR SALE PURPOSES FINE 500 BAH/TREE
  13. NO CHAINSAWS FOR FELLING FINE 500 BAH
  14. NO HUNTING; FINE: JUNGLE BIRD 500 BAH; WILDLIFE 2,000 BAH
  15. NO SERVING AS GUIDE TO OUTSIDE HUNTERS FINE 2,000 BAH
  16. OUTSIDE HUNTERS CAUGHT SETTING FIRES TO FLUSH GAME TURNED IN TO RED AUTHORITIES
  17. NO DISPOSAL OF PESTICIDE CONTAINERS IN STREAMS FINE ?
  18. ALL REVENUES COLLECTED FROM FINES FOR DEPOSIT IN MOBAN DEVELOPMENT FUND
  19. NO OPEN GRAZING; STALL FEEDING ONLY FINE ?

**Best Available Document**

The Pong Sa committee has also placed a ban on hunting, setting fines of 500 baht (\$21) for jungle birds and 2,000 baht (\$83) for wild pigs. If an individual is caught acting as a guide to hunters from outside the community, the fine is also 2,000 baht. Outsiders who are caught hunting in the area or who start fires to flush game are turned over to the RFD officers or local government authorities. The revenues collected from fines go into the community development fund. Villagers who fail to pay their fines are sent to the district office. While first-time warnings have been largely effective in ensuring that rules are followed, the *kamnan* feels that the rules serve as an effective deterrent and will need to be enforced periodically.

The Network forum has been particularly worried about the problems of pesticide contamination originating from commercial cabbage field runoff in the upper watershed. The local people are attributing the massive fish die-off in the streams and rivers draining the subwatershed to pesticide overuse. The forum is attempting to discourage farmers from using heavy applications of chemicals and has decided to levy fines for throwing contaminated containers into the streams. Ultimately, the forum's goal is to induce farmers to abandon pesticide applications altogether and to shift to the organic farming techniques advocated by a demonstration farmer, Mr. Chan (see below). Forum leaders report that half of the farmers in Nam Sa have substantially reduced their pesticide use. The forum is also concerned about the recent introduction of chainsaws into the watershed. While most committees have agreed to ban them, placing a heavy fine of 5,000 baht (\$208) on violators, the *puyaiban* of Khun Sa Nai village has allowed one insistent man to continue using his chainsaw. The forum is applying pressure on him to change his decision.

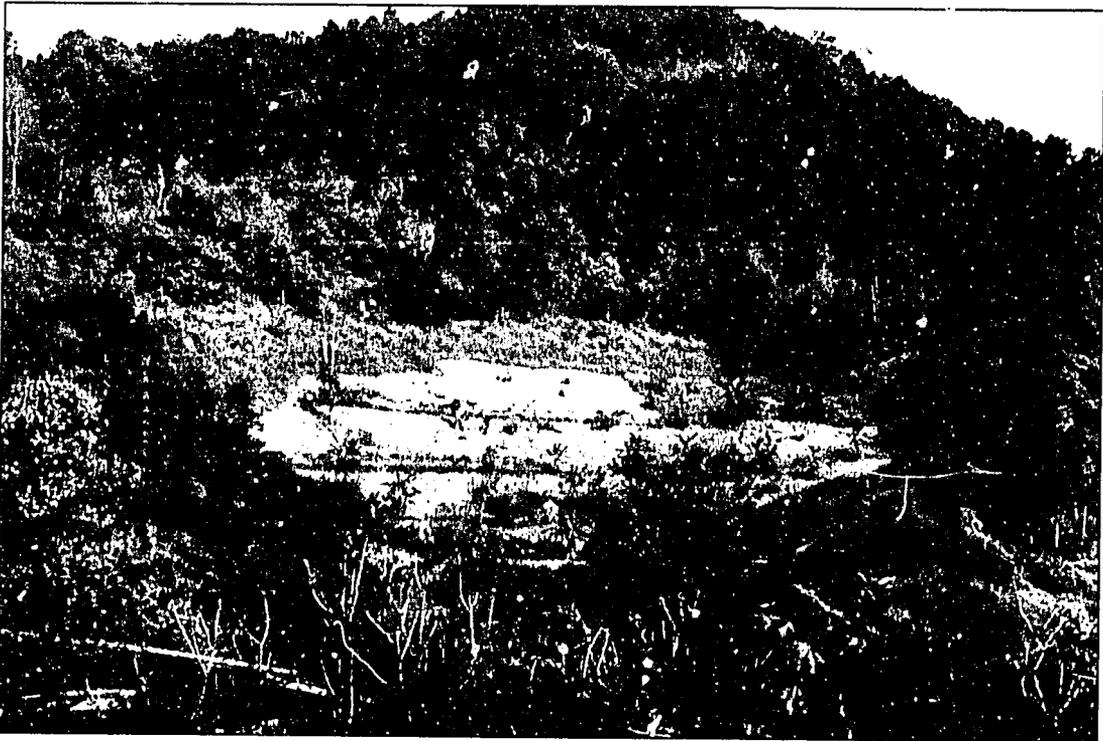
Recently, forum members have been working to construct a communal meeting hall. As the joint management program in Nam Sa evolves, there is a growing sense of commitment to forest protection by the community, combined with the feeling that the environmental stability of the villagers' homelands will be sustained into the future. This stands in sharp contrast to the official, legal position, which denies rights or responsibilities of these communities over the forested watershed.

### *Uncle Chan*

A frail, sixty-four-year old Karen hill tribe farmer from Pong Sa village, "Uncle" Chan lives with his family in a small wooden house on stilts located on a ridge "a dog's bark away" from the main settlement.



Royal Forest Department project officer and community organizer discuss the importance of three-dimensional watershed maps to facilitate community land-use planning in Nam Sa.



Formerly cultivated ridgetops in Nam Sa's upper watershed are now rapidly regenerating into dense evergreen forest while hill tribes shift to terraced, more permanent fields below.



Swiddening hill tribes in the Nam Sa highlands are in the process of shifting their ridgetop fields to terraced, irrigated lands on midslopes and in the river valleys.



Intimately involved in agriculture and forest product collection, Lisu tribal women in Nam Sa actively participate in Muban Committee meetings on forest protection and management.

Over one hundred years ago, his ancestors migrated into the area from Burma. For his entire life, Uncle Chan has cleared and converted secondary forests to fields in the hills surrounding Pong Sa, practicing traditional Karen techniques of rotational swidden farming. As noted, the Karen rarely if ever cut primary forest, but instead return to their old fields after leaving them fallow until soil fertility is renewed. When Uncle Chan was a young man, he recalled how he allowed his fields “to rest” for 8–10 years or more so they could rejuvenate. Today, as the population of the area expands, with highland and lowland migrants geographically squeezing the midlands, Chan has been forced to shorten this cycle to five years, clearing ten of his fifty *rai* annually.

In the past, Uncle Chan cultivated opium in his swidden plots, as well as upland rice, corn, cassava, and other food crops for family consumption. While he could harvest over three kilograms of opium per *rai*, making it by far the most profitable crop, his increasing awareness of the liability of his own addiction and the fact that he was poisoning others finally led him to stop cultivating the crop. Influenced by the messages of RFD officers and community organizers, three years ago Chan decided to cease farming his upland swidden plots and to begin practicing more intensive agriculture near his home. Tapping his years of experience with mixed polyculture production, he now grows over seventy vegetable, herb, and fruit species in his three-*rai* home-garden. His staple foodcrops include rice, cassava, maize, and sweet potatoes; in addition, he grows eggplant, squash, beans, chilis, and mixed greens. He also cultivates his own coffee, tea, and spices—including key ingredients in Thai cooking such as lemon grass and basil—and underplants bamboo and rattan shoots in the surrounding natural forest. Huge papayas hang from Chan’s trees, along with bananas, guavas, pomellos, lemons, apricots, and a variety of fruits unknown outside of Thailand.

To provide cash income, Chan’s family raises silkworms on mulberry plants intercropped between the rainfed rice. Chan uses the stalks to mulch his soil and grows pigeon peas to fix nitrogen and enrich the soils with organic matter. Based on his success, Uncle Chan has become a demonstration farmer and key spokesman in the village for the transition away from highland swidden plots of opium and cabbage. Before the Network forum and Muban Committees were formed, Chan recalls that forest use in the subwatershed was out of control. Villagers were competing for land, communication channels were poor, and conflicts between upland and downstream communities were frequent. Chan

has assumed an important leadership role in raising his neighbors' awareness of the interrelated problems and ecological linkages among deforestation, soil erosion, hydrological stability, crop productivity, and pesticide contamination. He has developed his own organic biocide spray, made from a concoction of tobacco, neem leaves, ginger, lemon grass, and soap and has become an outspoken campaigner against the use of chemical pesticides. Chan believes that pesticides have killed most of the stream fish and caused ill health in the community.

Uncle Chan's hilltop home garden is surrounded by lush, regenerating evergreen forests—land in swidden not long ago. He recalls that the grove of dipterocarp trees towering in the distance used to be his grandfather's swidden plots. From the forest surrounding his farm, Uncle Chan collects more than twenty types of medicinal plants, which he and his wife use to treat family illnesses. They also gather a variety of mushrooms, fruits, and other forest foods to enrich their diet. Closer by, where dry rice had grown only five years ago, bamboo and coppice shoots from tropical hardwood species stand over ten meters high. Chan explains that the Karen tend to grow food in a particular field for only one year, leaving the big trees and smaller coppice stumps when they clear the plot. Through this management strategy to enhance natural regeneration potential, the forest rejuvenates quickly, often growing up to three meters a year.

At each Network meeting, Chan reminds his village neighbors that they can feed themselves and sustain a good life if they practice the conservation and wise use of the watershed's natural resources. He notes that at first the Hmong and Lisu resisted the idea of changing their practices of extensive upland shifting cultivation. But over time, as they visited Chan's farm to listen and learn, many have come to understand the need to practice settled agriculture given the growing population pressures and ecological sensitivity of the uplands. The power of farmer-to-farmer extension and demonstration in affecting change has been remarkable. Recently, Uncle Chan was honored by an unexpected invitation to speak to villagers from an adjacent subwatershed who have heard of his commitment and progress in Nam Sa.

### *Spirit Forest*

The Lisu village in Nam Sa subwatershed was established thirty-six years ago by tribals who migrated from northern Chiang Rai and Tak provinces. Until two years ago, most of the forty families in the village derived the bulk of their income from opium cultivation. Con-

sistent contact with community organizers and Muban Committee members in the Network gradually convinced the Lisu to stop growing opium and shift to plantations of mixed fruit trees in their upper fields. The Lisu community now holds regular committee meetings to discuss resource-use issues and management strategies. To ensure participation, each household is required to send at least one member over fifteen years of age to attend the meetings. Failure to do so results in a 100 baht (\$4) fine for elected committee members and a 50 baht (\$2) fine for other households in the community.

Typically located above the community, the spirit forest, or *apamu*, in a Lisu village functions as a sacred grove. The village shaman identifies a tree near the top of a ridge where the spirit resides, and the community builds a shrine to make regular offerings. The spirit forest has historically functioned as an inviolable source for food and medicine. The Muban Committee has designated 1,000 *rai* in the upper watershed as strictly protected forest, substantially extending the 50-*rai* domain of the original spirit forest. It has placed a ban on tree-cutting in the entire protected area, much of which is regenerated evergreen forest. Even more effective than the ban as a deterrent is the traditional belief that the forest spirit will create problems for those who disturb its habitat. A village story is told about a man who cut a tree in the *apamu* and lost his ability to walk until he offered a pig's head to the spirit. The committee is considering a new rule that offenders must take a vow before the spirit, swearing to no further transgressions. In addition to their protected spirit forest, the Lisu have designated an additional 400 *rai* of forest for fuelwood supply. Committee members have subdivided this area into eight compartments, to be used on a rotational basis for the collection of dead and dry timber. The fine for cutting green trees in the fuelwood forest is 500 baht.

With financial and technical assistance from the program, the Lisu have begun to construct terraced rice fields along the streams further down the valley. Initially, the project had requested the communities in the upper reaches of the subwatershed to shift both their villages and their fields to lower areas. Lisu and Hmong communities were reluctant to move, and new settlement locations for villages were difficult to find. A compromise agreement was reached with the Lisu, so that only upland fields would be shifted. While this means a longer walk to lowland fields, the Lisu feel it is preferable to resettling their homes. With the use of communal labor, 10–15 days are generally required to clear and terrace one *rai* of paddy field, including the construction of diversion dams

and irrigation canals. To facilitate water management, several Hmong and Lisu communities are also forming water user associations (*muang fi*). Through the collection of fines, as well as funds allocated by the UN Fund for Drug Control, the Lisus' village development fund currently contains an impressive balance of 11,000 baht (\$458).

### **Reflections**

Spurred by a number of forces, the forest resource management initiatives by communities in the Nam Sa subwatershed have accelerated over the past few years. Members of the Karen tribe were increasingly distressed about the negative impact of upstream deforestation resulting from Hmong and Lisu clearance practices of ridgetops and steep slopes. Deforestation in the upper watershed was threatening the Karens' agricultural systems in the valleys and generating conflict among hill tribe communities that were failing to communicate with each other. Simultaneously, the Hmong, Lisu, and Karen had all grown concerned that the government might try to resettle them completely outside the subwatershed. The official policy to restrict habitation in certain reserve forest watersheds and the implementation of the controversial Khor Jhor Khor resettlement program posed serious threats to the villagers' tenure security. By cooperating with the RFD and other agencies, the communities may have felt they could evolve effective co-management strategies which could reduce the possibility of their resettlement out of the area.

Since Nam Sa was opened up seven years ago, villagers have also been subjected to increasing pressure to abandon opium cultivation. Project officers today report that opium fields have declined from 800 to 150 hectares in the entire watershed project area.<sup>12</sup> The community organizers from the project were initially instrumental in helping villagers construct maps, understand watershed linkages, organize committees, establish a Network forum, and cooperate with each other in identifying strategies to deal with outside pressures and threats. By now, most of the Muban Committees in Nam Sa have become self-reliant, actively pursuing solutions to their management problems with minimal outside intervention. The program is beginning to multiply as Nam Sa's Network leaders such as Uncle Chan are invited to share their experiences with subwatershed councils in neighboring areas. Many of the sixty villages in the Pai watershed are now following Nam Sa's model, establishing Land-Use Committees and management systems with explicit rights, rules, regulations, and responsibilities.

The Nam Sa experience holds promise that if encouraged and empowered, local communities in northern Thailand can successfully establish decentralized controls over resource use and begin to reverse the process of deforestation and environmental decline. In many cases, controls over burning, logging, and upland forest conversion to swidden have resulted in rapid regeneration of the natural forest ecosystem. While attempting to respond to the diverse needs of the traditional communities of the region, the program's Network of locally derived community institutions provides the operational access controls which have stabilized forest resource use. The village committees have joined the RFD as allies and partners in ensuring the protection and regeneration of natural forests in the upland watershed.

The hill tribes of the Sam Mun mountains are an intrinsic component of a dynamic watershed system. In contrast to the conventional resettlement approach which dislocates communities and would leave the watershed unpopulated, unprotected, and vulnerable to disturbance from outside forces, the Nam Sa project approach—while requiring compromise and consensus from all parties—has been able to respond effectively to both environmental goals and community needs. Ultimately, the question of insecure land tenure remains an open-ended, unresolved threat to the tribal communities of Nam Sa and beyond. The current land-use permit program will be unable to address the tenorial needs of the hill tribes, which lack Thai citizenship. It is hoped that as the documentation and dissemination of learning from inspired, grass-roots community initiatives spreads, a supportive national policy will be issued in Thailand to legitimize such management partnerships between the RFD and forest-dependent community groups such as those in Nam Sa. Only then will motivated rural communities across the Kingdom's northern watersheds have a chance to re-establish controls and share in the stewardship and benefits of their forest homelands.

## SUMMARY

Thailand is on the cusp of a new era in participatory forest management. The transition from conflict to cooperation and from open forest access to community-organized access controls is well underway in numerous parts of the country. Given a supportive environment, which includes institutional mechanisms to ensure two-way communication flows and information feedback, local communities are proving their abilities to work as partners with each other and the RFD to reverse forest degradation. Local leadership, exemplified by Dong Yai's Tambon Council and sympathetic forestry extensionists such as the COs in Nam Sa, can help create a climate of improved trust and communication among community user groups and better understanding about diverse village needs and priorities.

Forest-dependent communities hold the greatest stake in the sustainable use and management of their surrounding natural resources. Generations, often centuries, of traditional forest use by communities have resulted in valuable indigenous knowledge concerning patterns and processes of biologically diverse forests. With the establishment of secure systems of community protection and regulated extraction, field evidence underscores what traditional forest communities like the Karen already know: the powerful—as yet untapped—potential of natural forest regeneration on degraded lands across a wide range of Thailand's agro-ecological zones.

By reversing the conventional view of community groups as the problem and instead approaching rural populations as the potential key to the solution, new paradigms of collaborative forest co-management can be developed and tested. The sooner Thailand's national policy supports such models, the greater the chance for reversing conflict situations of open-access forest exploitation which spiral out of control.

While a formal community forest management policy still awaits official approval by the government, there is an emerging interpretation of "unwritten" policy in Thailand which supports community participation and empowerment. This unwritten, tacit policy, based on practice, represents the concerted efforts of a coalition of a new generation of RFD staff, working together with university-based social scientists, foresters, economists, nongovernmental organizations, and rural communities. This coalition is assisting community management groups throughout the country, inventorying indigenous, informal management systems and forest areas, and monitoring natural forest

regeneration processes under community protection. As Dong Yai and Nam Sa experiment with strategies and generate important lessons concerning the institutional and socio-ecological possibilities of community management systems, an alternative path toward forest sustainability and development equity is being forged.

## ***POSTSCRIPT***

The Thai research teams feel increasingly convinced that the key to stabilizing the nation's forest resources is to support the involvement of rural communities in protection and sustainable management, as in Dong Yai and Nam Sa. The potential scope is vast. Over seven million hectares, or one-third of Thailand's forest area, is currently degraded and occupied by communities.

The diagnostic systems research undertaken by the teams in the first two years has been synthesized in these initial case studies. More detailed and specialized topical research is planned in the coming years. Fortunately, conflict mediation and community management mechanisms are already functioning on the ground in both the Northeast and North study sites. The Thai teams have accordingly set their priorities on comparative studies of forest structure and regeneration in old swidden plots in various stages of secondary succession, in the North distinguishing among different land-use practices of the Hmong, Lisu, and Karen. This will be complemented by further exploration of interagency coordination, the processes of decentralization in watershed management through information-sharing and social networking, and villagers' changing attitudes and perceptions as forest managers. The objective is to develop predictive capacity in identifying factors conducive to organizational sustainability and widespread replicability of community management systems across watersheds and regions. Current and potential income-generation opportunities from non-timber forest products, with a focus on bamboo shoots, mushrooms, vegetables, medicinals, and edible fauna, will also be investigated. While bamboo and rattan experimental trials will be continued by the team in the Northeast, the next phase of research in Dong Yai will expand to include small-scale natural forest underplanting and management of rattan and edible bamboo by the communities.

New institutional strategies are evolving. Over the past two years, the Community Forestry Unit (CFU) of the RFD has involved its regional offices in a comprehensive inventory of the community forest management organizations in their respective territories. To date, approximately 12,000 local groups have been identified, including forests

managed by local monasteries, schools, community and kinship groups, and nongovernmental organizations. The CFU has also requested each region to compile an in-depth case study of one effective community protection group each year. The case studies are used as issue-oriented discussion materials to help RFD staff understand community organizational needs and the types of policies, programs, procedures, and attitudes which can best support local forest management activities. The broad-based involvement of regional RFD staff in diagnostic baseline surveys, participatory rural appraisals, and case study documentation helps to focus their attention on community management systems and stimulates staff awareness of the importance of these initiatives. Major shifts have already occurred in the attitudes, capabilities, and field operations of many RFD staff in support of community management.

## NOTES

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