People in the forest: community forestry experiences from Southeast Asia

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Abstract: This paper documents experiences of community forest management in five Southeast Asian nations. It briefly describes the historical and political context that frames contemporary forest sector changes, examining important shifts occurring in the forest policy sector in Cambodia, Indonesia, the Philippines, Thailand and Vietnam, following the decline of industrial forest management paradigms over the last two decades and the emergence of a new generation of environmentally and socially oriented policies and legislation. The paper explores how these new policies, laws and national programmes are affecting forest-dependent people across the region in an effort to track the transition in forest management on the ground. The paper also examines how community forestry systems are affecting forest cover, biodiversity and rural livelihoods.

Keywords: community forestry; Southeast Asia; forest cover; biodiversity; livelihoods.

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1 Introduction

Scientists estimate that Asia's forest cover has shrunk by 70% over the past 8,000 years ago, and that 95% of intact closed forest has been lost (Salim and Ullsten, 1999). The majority of this deforestation has occurred in the past century resulting from logging, land clearing and fire. Between 1900 and 1989, Southeast Asia's forest area declined from 250 million hectares to 60 million hectares and continues to erode at well over one million hectares per year (Scott, 1989). In many Southeast Asian nations, forestry policies are being changed in hopes of stemming the further loss of remaining tree cover, but is it too little, too late?

Over the past two decades, a ground swell of support has emerged from many quarters to assist communities to reestablish management over their forests and woodlands. Planners have crafted national Community Forest Management (CFM) policies, while legislatures have passed laws in empowering communities and local government with resources stewardship rights and responsibilities. Development agencies have invested hundreds of millions to support CFM implementation, while urging governments to give them high priority. Scientists have documented indigenous systems of resource use, customary laws and the long history of resource conflicts. NGOs have multiplied, many focusing on building CFM support capacities including community organising strategies, participatory mapping and planning procedures and livelihood enhancement schemes.

This paper documents experiences with CFM in five Southeast Asian nations. It briefly describes the historical and political context that frames contemporary forest sector changes, examining important shifts occurring in the forest policy sector in Cambodia, Indonesia, the Philippines, Thailand and Vietnam, following the decline of industrial forest management paradigms over the last two decades and the emergence of a new generation of environmentally and socially oriented policies and legislation. The paper explores how these new policies, laws and national programmes are affecting forest-dependent people across the region in an effort to track the transition in forest management on the ground. The paper also examines how community forestry systems are affecting forest cover, biodiversity and rural livelihoods.

2 CFM in Southeast Asia in the 20th century

As Southeast Asia's forests were nationalised in the 20th century and the timber industry expanded its operations throughout the region, vast areas of forests were degraded. At the same time, indigenous systems of management were displaced. The erosion of customary forest management systems has generally led to the deterioration of forests in many parts of Asia. In a study for the World Bank, Bromley and Cernea reported that:

> "The dissolution of traditional local institutional arrangements has not been followed by the establishment of more effective institutions, and national governments in most developing countries have not adequately substituted for these former resource management regimes." (Bromley and Cernea, 1989)

While state sponsored agencies, such as forest departments and state forest enterprises, have been authorised as resource managers, or have delegated these responsibilities to private sector timber companies, they have generally failed to implement management rules on the ground that lead to sustainable use. The rise of state agencies and private companies as forest managers has generally coincided with an accelerating loss of natural forests throughout the Asia region during the post World War II era. In Southeast Asia, tropical rainforests receded from 250 million hectares in 1900 to below 60 million in 1989 (Poffenberger, 1990).

By the 1980s, the deforestation of Asian lowlands as well as the deteriorating condition of many upland watersheds, began generating concern among national planners and the development community alike. Floods and brownouts affecting Bangkok, Jakarta, Manila and other urban centres brought deforestation issues to the attention of the public as well, initiating a new generation of environmental protection policies including

logging bans. There has been growing recognition through the 1990s in many Asian nations that rural people have an important role to play in managing and protecting forestlands, including those nominally under state jurisdiction.

> "Each year more nations are approving initiatives that provide forest user groups with greater rights and responsibilities in the care of protected areas, upland watershed forests, production forests and timber concessions." (Poffenberger, 1996)

This historic translation reflects an important shift in forest policy characterised by emphasis on building state authority from the mid-19th century, to a greater stress on devolution, decentralisation and community rights over the past decade.

While the forests of Southeast Asia were sparsely inhabited by scattered groups of people for thousands of years, that scenario has changed dramatically in the past century. This study estimates that there may be over 140 million forest dependent people in Cambodia, Indonesia, the Philippines, Thailand and Vietnam, representing about one-third of the population in those nations. This estimate includes individuals who live on or near forestland and are dependent on it for a significant portion of their livelihood requirements (Table 1). It is not surprising that forest-dependent populations are large considering that 'state forestlands' represent over 50% of the national land area in Cambodia, Indonesia, and the Philippines and over 25% in Thailand and Vietnam.

Table 1 Population of forest dependent people

Country	*Total population 2000* (*million*)	*Number of forest-dependent people (million) and percentage of total population*	*Total forest area* (*million hectares*) *and percentage of total land area classified as 'state forest'*
Cambodia	11	1.4 (13%)	9.3 (52%)
Indonesia	210	80 (38%)	181.2 (60%)
Philippines	76	25 (33%)	15.8 (51%)
Thailand	62	10 (16%)	14.8 (25%)
Vietnam	79	25 (32%)	9.5 (28%)

Given the immense population and their economic dependence, it is remarkable that the region's governments did not consider them to be a major component in management until recently. Rather, communities and their forest use practices were condemned and programmes to resettle them gained popularity throughout the region in the 1960s and 1970s. The eradication of swidden farming, a major forest use system throughout upland Southeast Asia, was a high priority. Since the forestlands on which they lived were nationalised, and were largely considered 'state domain', forest-based communities had no tenure status and were frequently considered 'encroachers' and subject to legal action and expulsion. While industrial logging was widely believed to be the engine of early economic development in post-war Southeast, deforestation was blamed on illegal occupants of the forest and the practitioners of 'slash and burn' agriculture. The government attitude towards forest-dependent people was hostile, and most development agencies were readily supported with projects to accelerate logging and remove the unwelcome populations throughout the 1970s.

Long rotation forms of agriculture, often referred to as swidden or 'jhum' farming, are often lumped into one broad category and referred to with the pejorative term 'slash and burn'. Yet, swidden farming practices are some of the earliest forms of cultivation. They exist in a myriad of forms suited to different environments, labour availabilities and markets. Swidden systems are typically used in upland environments, often in sites where marginal soil fertility limits the number of cropping cycles to several years, after which yields fall steadily. The inability to sustain agriculture is usually because of rainfall, slope and soil conditions that allow nutrients to rapidly leach out of the earth once forest cover is removed. In such situations, local populations frequently adopt cultivation strategies that involve clearing forest areas and burning vegetation to release nutrients, planting crops for one or two seasons and then fallowing the land to allow forest succession to proceed along with the return of fertility.

Indigenous forest farmers usually plant a variety of species within a swidden field, diversifying risk and providing a mix of subsistence food, and, increasingly, cash crops as well. Many traditional shifting cultivation systems in Southeast Asia are developed to minimise erosion and fertility loss, ensuring healthy and rapid forest succession and allowing for future agricultural use. These cultivation systems are frequently lumped together with agricultural practices of migrant people who move into upland watersheds to clear forests for crop production. Migrant farmers often clear logged-over forests to plant commercial crops, often as a monoculture system. Migrants may lack local knowledge regarding indigenous strategies to reduce soil erosion and control forest and soil damage from burning. They may attempt repeated cropping cycles, severely depleting soil fertility and constraining future forest regeneration on the land.

There is no question that swidden cultivators place pressure on Southeast Asia's natural forests, though in many areas, in the past, the cycle of forest clearing and natural regeneration has been remarkably sustainable. For example, a longitudinal study of forest cover in Ratanakiri Province in Northeastern Cambodia showed little change in total forest cover over a 50-year period, only a rotation in the mosaic of land use systems (Fox, 2002). As rural populations have grown and land areas have remained static, forest clearings have expanded and fallow periods have shortened. Traditional systems that may have allowed 10–15 year for natural forest regeneration to take place are currently clearing young secondary growth after 5–7 years or less. Upland farmers are compensating for the lack of fallow time for soil fertility to be restored, by adding increasing quantities of chemical fertilisers.

In other areas, rotational swidden farming is evolving into more permanent agroforestry systems. Once initial food crops (tubers, corn, rainfed rice, etc.) are grown, perennial cash crops are allowed to dominate and develop into forest gardens that can provide a long-term source of subsistence foods and spices, fruits and other goods for sale. This shift from more subsistence oriented, swidden farming and fallowing to sedentary agro-silvicultural systems is an ongoing process in many upland regions of Asia. For the most part, this transition is being driven by farmers and market forces, with limited support from government agencies or development organisations. This land use transition has many attractive features including stabilising forest cover, reducing land disturbance and soil erosion, improving hydrological function and biodiversity habitat. The transition in resource production systems is often constrained by land tenure insecurity, as very few swidden plots have been titled or even recognised by most governments in Southeast Asia. Typically, land laws respected private ownership only on lands that have historically been under sedentary agriculture, while rotating swidden

fields are viewed as part of the 'state' forest domain. In some Southeast Asian nations, recent policy reforms are giving greater acknowledgement to ancestral lands of upland people that practice shifting cultivation, but a policy framework that systematically addresses the tenure needs of swidden cultivators is far from articulated in any country in the region.

The unclear tenure status of upland communities has also created opportunities for lowland migrants to flood into forested watershed in search of agricultural land. They often bring with them more commercially oriented, monoculture farming systems from the lowlands. In many areas with steep slopes and poor soils, these practices have proved to rapidly degrade soil fertility and generate high levels of erosion. This pattern has been well documented in the Philippines, where four to five million indigenous people have been joined by 12 million migrants over the past 50 years. Migrant people have often followed the commercial loggers, entering on their dirt roads to open fields on marginal upland slopes. The pressure has frequently displaced indigenous people, pushing them further up the mountain and into more critical forest areas. This pattern is also seen in Vietnam, Cambodia, Thailand and Indonesia. From that standpoint, CFM has broad implications for land law and tenure rights and responsibilities throughout Southeast Asia. It is not simply a question of forest management, but tightly tied to human rights and social development concerns.

3 Social responses to deforestation

The appalling loss of Southeast Asia's forest over the past 50 years had not gone unnoticed by these national populations. Villagers are well aware of the impact of their own and neighbour's use on forest cover, as well as the effects of logging operations, plantation establishment and mining activities. In communities living within and around forest areas, deforestation has often had a profound impact on quality of life and income generation. Urban residents are also not untouched by forest loss. As downstream flooding and power shortages grow more frequent and severe, middle class city dwellers have begun mobilising political pressure to force governments to take action. The emergence of an expanding environmental movement has its strongest support among urban middle-class people, who are increasingly well informed through the mass media.

Concern over deforestation and the need to find national solutions to growing environmental problems have fostered the establishment of formal civil society dialogues in a number of Southeast Asian countries that draw on the sentiments of rural and urban people. These attempts to bring stakeholders together at a national level are taking the form of working groups, special committees, environmental networks and fora that meet regularly to debate and advise government policy makers. Finally, national governments in a search for more sustainable systems of natural resource stewardship have been strengthening community and local government roles through democratisation and decentralisation policies and laws that have been promulgated in recent years.

Over the past decade, many Southeast Asian nations have passed laws and policies to devolve and decentralise government administrative functions to the district and sub-district level officials who are downwardly accountable to local populations. Democratic decentralisation is an effort to enhance popular participation in resource stewardship and formally institutionalise it within a governance framework (Ribot, 2002).

Decentralisation often involves new systems for the election of village representatives, delegation of small development budgets and new authority for the management of natural resources. As part of the process of decentralisation, forest department field staff may be increasingly placed under the supervision of provincial or district authorities, with less control by central technical ministries. Arguments in favour of decentralisation include greater equity in resource access and greater management and economic efficiency in terms of reduced transaction costs, better matching of services to needs, mobilisation of local knowledge and increased public sector accountability (Poffenberger, 1996).

Decentralisation and devolution trends hold promise of new support for community-based resource management. With forest management under local government authority, many resource management specialists feel that communities will be able to negotiate collaborative agreements better. For the most part, the impact of decentralisation and devolution policies on community involvement in forest management is hard to assess, as these reforms are still being implemented. Capacity at the community level, as well as local government level, to formulate and implement management plans is still in an early phase of development. Accountability of local government representatives to constituent communities is often limited, as many provincial and district officers still see their authority as emanating from above, rather than from the communities below. In other cases, local government chiefs operate as authorities unto themselves, and the decentralisation of greater control to the province from the central government has only accelerated deforestation. This has been the case in many parts of Indonesia since the end of the New Order government brought decentralisation policy reforms, as well as in some provinces in the Philippines. A recent World Resource Institute study in Southeast Asia noted that local government and community strategies may not be supported by national policies, even when natural resource management responsibilities have been delegated, ultimately undermining local management initiatives.

While the rapid deforestation of Southeast Asia during the last three decades has recently begun to find reflection in the emergence of CFM policies, as well as a broader trend towards the decentralisation of natural resource management authority, it has also found a voice among the region's rural communities. Villagers in growing numbers are concerned over the alienation of ancestral lands, the degradation of natural forests and the loss of important sources of livelihood and residential place, and they are organising and expressing their feelings to local and national government representatives.

According to Jeffrey A. Sayer, past Director General of the Centre for International Forestry Research (CIFOR):

> "In many countries, the most visible symptom of bad governance has been abuse of forests and land, and the lightening rod for expression of public dissatisfaction with corrupt governments has been the struggle for equity in access to natural resources. It was, therefore, no surprise to find Indonesia's nascent environmental organizations at the forefront of the barricades during those tumultuous days in May 1998 that led to the overthrow of the Soeharto regime." (Sayer, 2002)

By 1999, the process of forestry sector reform was well underway, and decentralisation and CFM were high on the political agenda in Indonesia. Such reforms have also been high priorities in the Philippines and Thailand at the national political level, while moving forward with lower profile in Cambodia and Vietnam.

4 Community forestry policy development

Over the past 15 years, many nations in the region have begun crafting new policies and laws that enable communities to gain greater legal rights and responsibilities as stewards of 'state' forestlands. This trend is tied to a growing recognition by policy makers, development planners, resource managers and economists that commercial timber exploitation models are proving to be unsustainable, and that the long-term costs will far outweigh short-term benefits. National policies are an attempt by those in positions of leadership to articulate the directions that society is meant to take. They are 'attempts' because policies may or may not be implemented, and may or may not influence resource use behaviour, depending on their effectiveness.

The process through which legal frameworks are formulated to enable community engagement in state land management varies widely from country to country, depending upon the political environment, government and legal institutions and influence of donor agencies among other factors. In many cases, it begins with projects and evolves into national programmes with policy support articulated in the form of regulations, government orders and amendments to forestry laws. Countries such as India, Philippines and Nepal already have 5–7 years of experience in CF policy development and implementation. The Philippines launched a community-based forest management policy in 1995, after a decade of experimentation with CF styled projects and schemes. In Nepal, CF became a government priority programme in the early 1990s, though forestry projects had been developed in the field since the early 1980s.

In terms of the impact of new policies and legislation empowering community forest management, they appear to have had more influence in helping leverage donor investment in this sector, than in securing community rights to state forestlands. Many of the initial policies have been cautiously framed, restricting community rights to income flows from forestlands. By contrast, donor investment in CF and related participatory resource management initiatives in Asia over the past decade have totalled between two to three billion dollars, fuelling a plethora of field projects, training activities, meetings and workshops, and publications all of which have given the forest sector transition considerable energy.

Two policy strategies are emerging in Southeast Asia that support greater community involvement in forest management. The first involves the formulation and implementation of laws and policies that explicitly articulate community rights and responsibilities on lands that have historically been claimed by the state and managed by its agencies or private sector leases. The second are policies that support devolution and decentralisation, including increased local government authority over natural resource management planning, protection and production. It is useful to compare national experiences with these two distinctly different approaches for crafting a supportive policy environment.

5 Community forestry impact on the ground

Over the last two decades, CFM has gained attention in many parts of Southeast Asia as a viable approach to public forestland management. Its growing popularity is reflected in the ratification of CF related laws, the adoption of supportive policies, the expanding investments of bi-lateral and multi-lateral agencies in CF programmes, the broadening

engagement of NGOs and academic institutions in CF activities and the emergence of community-based forestry networks and associations. A number of Asian countries are developing national policies and laws that formally extend new forest management responsibilities, rights and roles to communities. Forest policy goals are increasingly moving away from industrial timber supply towards multi-purpose and adaptive management goals to better serve both the environment and the society. Donor agencies are making community participation and livelihood needs a major part of their development agenda and funding priorities. An increasing number of government foresters, who once bitterly criticised forest-dependent people as the root cause of deforestation, now view them as the best method to restore and protect watersheds and forestlands.

While the reorientation of the Asian forestry sector is being guided from above, it is gathering momentum on the ground where a growing number of communities are networking, federating and mobilising politically around shared concerns regarding forest and watershed management, livelihood needs and cultural preservation, supported by a rapidly expanding body of social organisations. Non-government groups involved in rural development activities are increasingly engaged in CFM support projects, and gaining expertise in this area. Community resource management has also become a popular topic of research and extension for academic institutions, while international organisations are starting to monitor the extent of transition to community forest management. The Food and Agriculture Organization has begun to integrate these types of information into global forest statistics (FAO, 2001).

According to Forest Trends, at least 22% of all forestland in developing countries is owned or accessed by communities (White and Alejandra, 2002). In Asia, it is likely that the majority of the region's forests are accessed by communities, since indigenous cultural communities populate and utilise even the most remote upland watersheds and lowland forests. Hamlets, clans and households allocate forest management rights according to customary practices and laws, and in many areas have been negotiating territorial rights for generations. While community forestry is gaining formal recognition in Asia through a new generation of policies and laws, new programmes are generally in an early phase of implementation. As a consequence, the integration of national forest sector policies and informal systems of forest stewardship is limited in scope and quality.

A gross indicator of the impact of new CF laws and policies is the proportion of state forestland under community management. In addition, the effectiveness of CF efforts may be best reflected in terms of restoring and protecting natural forests and agroforests, as well as in improving the socio-economic conditions of forest-dependent communities. Table 2 describes the amount of forest area in five Southeast Asian countries that have been formally transferred to community management.

Area under CF may include a wide range of environments, including a substantial amount of degraded forests, lowland forests, flood forests, mangrove forests, montane forests and even community fishery water areas in Cambodia. Most national community forestry programmes, at least in their initial phases, focus on degraded forest restoration through natural regeneration or plantations. In other cases, projects are geared towards community management of small-scale timber operations. Commercially and biologically valuable forests, typically of older growth, have generally been retained by the state for industrial use or placed under protected areas systems. This pattern, however, appears to be changing as environmental organisations find that community partners can help

conserve biodiversity, and as good forests in critical watersheds are taken out of timber production in order to achieve other management goals.

Table 2 Forest cover and community forestry management agreements

	Cambodia[*]	*Indonesia*[**]	*Philippines*[***]	*Thailand*[+]	*VietNam*[5_/]
Forestland (Territory under state authority)[@]	10,535	135,867	15,882	30,142	19,200
Area with forest cover ('000 has)[#]	9,335	104,896	5,789	14,762	9,819
Forestland where some form of community forestry is recognised by government ('000 has)	228 (fishery water areas) 100 (forest)	591	5,900	328	2,348
Percentage of forest land recognised as CFM areas	1	0.5	37	1	12
No. of groups involved	767 villages	NA	4,881 CBFM sites	1,300 villages	1,203 communes

Statistics on Forest Cover and Forest Change from: FAO, State of the World's Forests: 2001 (Rome: FAO, 2001, p.155).

*Tola and McKenney (2002).

**Includes community forest areas and community mangrove forest plantations. Data for Community Forest Area from Directorate General of Reforestation and Land Rehabilitation (MoF) as of 1995. Data for Community Mangrove Plantations from Forestry Statistics Indonesia (MoF) 1995.

***DENR Forestry Statistics (2003).

+Northern Thailand only. Based on figures from Local Control of Land and Forest: Cultural Dimensions of Resource Management in Northern Thailand by Anan Ganjanapan, Chiang Mai University, 2000.

@'Forestland' refers to territory under the authority of the state. These statistics reflect jurisdictional definitions of forest, rather than biological. Much of the 'forestland' included in national statistics retains only badly degraded forest cover.

#'Forest cover' statistics reflect land with a minimum canopy closure of 10–40%, depending on official definitions of forest.

The Philippines has, by far, the largest proportion of its state forest domain delegated to communities for management. Much of this has been achieved through the Certificate of Ancestral Domain Claim programme over the past ten years. Vietnam has approximately 12% of the state forest territory under local groups at the village or commune level. Recognition of community stewardship is authorised by the commune and district councils, since the nation has not yet ratified a national community forestry policy. Thailand, Indonesia and Cambodia have transferred a very small percentage of their state forestland to communities, but recent policy changes may allow for an acceleration of devolution in the coming decade. These statistics, for the most part, do not include significant areas of forest under indigenous and informal use by rural communities.

Beyond general figures for these country area 'accomplishments', it is difficult to measure the social impact of community management. CFM still largely belongs to the informal sector not only in terms of its economic relevance, but also in terms of overall government recognition and national awareness. While anecdotal stories of success and failure abound, no Southeast Asian nation has yet developed an effective national system for monitoring and evaluating the social, economic and environmental impact of community forestry initiatives. As a consequence, it is difficult to accurately evaluate the broader impact of CF at a national or regional level.

6 Impact of community forestry on forest cover, biodiversity and livelihoods

From an ecological standpoint, the impact of community forestry, as indigenous systems of resource use and management, as well as under projects and programmes sponsored by governments, NGOs and development agencies, is difficult to determine on a regional basis. This problem is primarily caused by the lack of national level data that monitor forestlands under community control. Unlike India, where joint forest management projects at the state level include field based monitoring, in Southeast Asia, much of experience emerging in rural areas is captured only in occasional case studies. Where data is available, it is largely through government-sponsored projects. It is possible, however, to examine a variety of examples of community forestry systems in different environments to assess their impact on forest cover and biodiversity.

Case 1: Krui District, Sumatra, Indonesia-In the 1990s, a coalition of NGOs together with the Center for International Forestry Research (CIFOR) conducted research and extension activities in Krui District in South Sumatra to understand and support community-based mixed forest gardens. A key element in this indigenous forest management system was the collection of resion from the *damar* tree (*Shorea javanica)*, which formed the canopy of a multi-storied forest patches. The dammar forest gardens are property of Krui families, though they are held under the community (*marga*) and are not transferable to outsiders. Yearly income per hectare of agroforest is estimated to range from $1200 to$1800 with a labour input of 127 person days. The national value of resin oil exports in 1987 was $4.5 million.

Research indicates that damar forest gardens also have high biodiversity values. In mature damar reserves, damar trees are interspersed with tall fruit trees like durian (*Durio ziebethinus*, nangka (*Artocarpus heterophyllus)*, manggis (*Garcinia mangostana*), petai (*Parkia speciosa*) and duku (*Aglaia dookkoo*). A recent comparative study of sample plots in primary forests in the area of the damar agroforests and rubber estates found that there were 230 plant species in rain forests, 120 in damar forests and only ten species in the rubber estates. In the rain forest sample sites, the bird species enumerated were 130 vs. 70 in the damar agroforests and five in the rubber estates. Damar forests were also found to be important habitats for endangered mammals such as the Sumatran rhinoceros, the Sumatran goat, tigers, tapir, gibbons and *siamangs* (monkeys). In effect, the damar forests act as a critically important buffer zone to the Bukit Barisan Selatan National Park, greatly extending the habitat for many species. Satelite images indicate that the mature damar forest gardens in Krui District cover 54,000 hectares. Attempts to expand rubber and palm oil plantations into the forest gardens would severely impact

their biodiversity and hydrological functions, but encroachments by large private sector groups have been stalled by the efforts of a coalition of NGOs and research institutions and resulted in formal recognition from the Government of Indonesia in January 1998 (Poeffenberger, 1998). Forest garden systems are found throughout lowland insular and mainland Southeast Asia in a myriad of forms that cover millions of hectares of land. While there are no statistics that monitor the condition of these forest systems, they are valued sources of livelihood and generally very productively maintained and protected. A major threat to indigenous agroforestry and forest gardens are the expansion of large-scale estate crops like palm oil, coffee and rubber.

Case 2: In Son La District in Northwestern Vietnam, Tai and Hmong communities have managed upland forests for generations. Forests are classified according to function including old growth protected areas (*Pa Dong*), younger secondary forests that are part of long rotation swiddens (*Pa Kai*), early regenerating forests (*Pa Loa*) and bamboo forests (*Pa*). The lands are held under communal tenure and allow for a well-managed landscape that supports considerable biodiversity. In Cao Bang Province, to the North the Nung an ethnic community found that their limestone forests had degraded because of the growing fuelwood and timber extraction pressures from State Forest Enterprises and local villages. After biodiversity and hydrology began to deteriorate in the 1960s and1970s, the communities in Phuc Sen organised to divide forest protection among the 12 villages. A combination of planting with indigenous pioneering tree species like *mac*, *rac* and more valuable timber species, combined with natural regeneration, has led to the reforestation of many of the limestone hillocks in the area. The restoration of the limestone forests has facilitated the reestablishment of spring flows that provide water for the lowland rice fields. It has also allowed for the return of many indigenous mammal species, including five endemic and 26 rare species. The process is currently being replicated through a Community Forest Network operating at the district and provincial level (Dzung et al., 2004). In many parts of upland Southeast Asia, communities are organising to protect threatened upland forests. Part of these initiatives deal with outside pressures from private sector timber enterprises as well as from the expansion and commercialisation of agriculture. The emergence of community forestry networks is apparent in upland areas of Indonesia, Vietnam, Thailand and Cambodia.

Case 3: In Kompong Phluk Village a Cambodian settlement on the northeast shores of the Tonle Sap (Great Lake), community members have been protecting the flood forest for nearly 60 years. Forest protection began after clearing of lakeside forests for watermelon left the community exposed to violent rainy season storms. The community also realised that the flood forests were spawning grounds for the fish on which their livelihood depends. For nearly half a century, through civil wars and social upheavals, the Khmer villages in the area have gradually built up their resource management systems, most recently with the support of an FAO project. At the present time, the village controls over 15,906 hectares of land and is formally recognised by the provincial government. The community forestry and fisheries committee follow a resource management plan, allowing for controlled fuelwood harvesting, monitoring fishing gear and catch levels and generating fees for management activities. With over 200 different species of fish in the lake, many endemic, the flood forests protected by the communities provide a critical habitat for biodiversity conservation (Evans et al., 2004). The engagement of communities in managing aquatic forests, both coastal mangrove and

freshwater, is expanding in many parts of Southeast Asia as governments recognise the need for local support in protecting these critical ecosystems.

Case 4: Across Java, communities are expanding indigenous agroforestry patches and forest gardens in an effort to improve the productivity of their land resources. These systems are based on traditional mixtures of species, and form multi-storied forestry ecosystems that include herbs, medicinals, climbers, fruit trees and timber trees. In some villages, nearly 200 species of plants are present. The forest gardens, referred to as wono dusun (village forest in Javanese) and talon (in Sundanese), are extremely profitable, often generating more income per hectare than irrigated rice fields, while providing greater protection against disease, pest and market risks owing to their diversity. While there has been no attempt to distinguish changes in forest cover under community and state management, research indicates that forest cover in Java increased by almost 6,00,000 hectares (from 1.27 million hectares in 1985 to 1.87 million hectares in 1997), largely because of the expansion of community-based agroforestry and forest gardens (FWI and GFW, 2002). This process is continuing as communities in some parts of Java are taking over degraded state forestlands and establishing mix-forest gardens (Arupa et al., 2004). It should be noted that the increase in these private, community forests on the island of Java comes with no investment from the state or any development agency. The reform of the State Forest Enterprise (Perum Perhutani) and the devolution of forest management to communities could allow for the transformation of several million additional hectares of degraded forestland on Java if an enabling policy framework were established.

The four cases presented above indicate the range of contexts in which communities are protecting, managing and restoring forests across Southeast Asia. From the coastal regions, across the lowland plains of insular and mainland Southeast Asia, to the tree line of the uplands mountains, communities remain the primary stewards for much of the region's forests. Throughout, Southeast Asian communities often play a critical role in preserving biodiversity and maintaining hydrological functions, yet their authority remains limited under the legislative frameworks that govern the formal forest sector in most Southeast Asian nations as well as the political economy that sets informal policies. While this situation is gradually changing, the limited rights and responsibilities delegated to community over forest resources continues to limit their ability to effectively manage local resources. Despite this constraint, anecdotal evidence indicates that communities are continuing to play an important role in biodiversity conservation and the protection of forest cover.

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