

The Rubber Boom Assemblage and Internalized Friction: Attitudes of the Government, NGOs, and Farmers in Northeast Thailand

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Northeast Thailand experienced a rubber boom that began in the 2000s with a sudden swing away from the trend toward sustainable forest management that had been widely accepted by society in the 1990s. The rapid expansion of rubber cultivation caused various ecological changes in the farmers' living environment. Faced with environmental issues, various actors in society were reluctant to take the measures necessary to stop these changes, even when there were legal provisions to do so. Among the bureaucracy, agriculture agencies were indifferent to deforestation and, in some cases, gave subsidies to non-titled lands despite regulations against this. Conservation agencies hesitated to regulate illegal cultivation strictly in the forestlands. At the study site, the Tambon Administration Organization stressed the importance of forest conservation but never criticized or prevented rubber cultivation. Villagers reached no consensus on regulating forest clearing or herbicide use but changed their customs to allow the enclosure of non-timber forest resources in private forests. Various actors, without mutual communication, perceived a political atmosphere in which poor people's hopes of a socioeconomic upgrade via rubber could not be denied under the conditions of electoral politics, despite environmental degradation. These were all elements of the rubber boom assemblage. The friction arising from rubber cultivation combined with anxiety regarding environmental degradation became internalized in the actors because the forces driving the rubber boom were so powerful. Therefore, at a glance, all actors suddenly seemed to become optimistic about rubber.

Keywords: Northeast Thailand, rubber boom, assemblage, social process

I Introduction

Northeast Thailand experienced a rapid expansion of rubber cultivation beginning in the 2000s. This was due mainly to the increase in the price of rubber in response to the

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growth of the automobile industry in emerging economies such as China and India, and the subsequent demand for tires. This rapid expansion occurred not only in Thailand but also elsewhere in Southeast Asia, such as Southwest China, Laos, Myanmar, Cambodia, and Vietnam. Despite differences in the acquisition and holding of rubber farms and the distribution of profits by country or region, a common factor in all of these areas was that previously self-sufficient areas became connected directly to the network of the global economy and industry via rubber (Fox and Castella 2013).

This rapid expansion of rubber cultivation resulted in ecological changes. The villagers acknowledged this, but they made no institutional arrangement to prevent the changes; and almost none of the environmental NGOs took action. Until extremely strong forest conservation policies were put in place by Thailand's military government in 2014, no governmental agency took effective measures in this regard, hesitating to exercise their legal authority. All actors were seemingly optimistic about the trend of the rubber boom. A social consciousness of sustainable natural resource management grew during the 1990s, after the logging ban. Optimism about the rubber boom and ignorance of the ecological degradation caused by the expansion of rubber cultivation suddenly swung the pendulum of opinion in the other direction.

Considering the trend since the 1990s in which the government, NGOs, and local communities had been seeking sustainable forest management and usage, this sudden swing by all sectors to prioritize rubber, in disregard of the law, seemed strange. This article analyzes the rubber boom as an assemblage. The world is being ceaselessly shaped and reshaped by assemblages consisting of heterogeneous elements, either in the direction of "territorialization"—making order from the center in a segmented structured way like a state—or "deterritorialization"—deconstructing the order into a multiplicity of linear movements (Deleuze and Guattari 1987, ch. 1). Assemblages are continuously rearranged in this process (Deleuze and Guattari 1987, ch. 11).

The formation and rearrangement of heterogeneous assemblages can explain social change. In her case study of a community forestry project, Tania Li (2007) reveals the process of power formation by which outsiders intervene in local communities with a "will to improve," by analyzing how various elements are assembled into a concrete project scheme. Michiel Köhne (2014) argues for the opposite, bottom-up direction of assemblage formation. According to him, the governance of an institute of a multi-stakeholder initiative for palm oil is formed through an assemblage of practices in a number of places, with variations somehow contradicting each other. In these ways, elements at different geographical scales interact, and these assemblages transform society as well as the assemblages themselves. Such assemblages not only exist in terms of what can be physically observed, like field-level projects, but can also be formed by human

and non-human actors on a global scale (Collier and Ong 2005; McFarlane 2009).

These studies assume a human actor to be a subject or agent holding a consistent idea. However, an individual human actor can also be an assemblage of heterogeneous elements. In this article, I analyze individual human actors as assemblages, as well as social events and phenomena, including those observed in local communities and those developing on broader geographic scales. In doing so, I explain the sociological mechanism of the rubber boom.

II Rubber, the Forest, Living Environments, and Assemblage

II-1 *Rubber in the Context of Forest Conservation*

Until the end of the 1980s, Thailand experienced serious deforestation as a result of commercial logging and farmland expansion. The gap between forestland in a legal sense and actual forest cover increased (Uhlig 1988; Pasuk and Baker 1995, ch. 2; Fujita 2003). In the 1990s, the government took measures to resolve the problem of this gap. Although the forest department enclosed core natural forests with high conservation value in terms of biodiversity and watersheds as protected areas, patches of secondary forest near local communities where the locals exploited natural materials for subsistence were to be managed and utilized by the local communities as community forests. Degraded forestlands were transferred to the Agricultural Land Reform Office in charge of giving cultivation rights certificates to local inhabitants. Through the implementation of these policies, especially the negotiation of community forests, the significance of sustainable forest management appeared to be widely accepted within society.¹⁾

Studies on the sociopolitical aspects of natural resource management have usually assumed that people are in a state of tension or conflict, and have analyzed the negotiations between them. Peter Vandergeest and Nancy Peluso (1995) and Peluso and Vandergeest (2001) view the history of forest policy in Thailand as “territorialization” of the forest by the state, excluding people’s access to resources.²⁾ Thus, the forest has been a place of conflicting interests between the state seeking forest enclosure for development or conservation and the people depending on forest resources for their livelihoods, or what they call the “political forest.” Colonialistic forest policies and legal

1) In the long debate about “community forest law” from 1990 to 2007, all actors agreed upon the need to manage community forests sustainably, including the Forest Department, conservation-oriented and local-people’s-rights-oriented NGOs, and local community representatives (Fujita 2008).

2) Their use of the term “territorialization” differs from that of Gilles Deleuze and Felix Guattari (1987), as it is more focused on actual contested rights over forest resources.

institutions sometimes caused physical conflicts, including the violent eviction of people by the government or guerrilla-like counterattacks against the state by the people. More often, however, the implementation of these policies and institutions were compromised by the decisions of field-level officers or through negotiations with local residents. Regardless, criticisms of colonialistic forest policies led to community-based natural resource management becoming a global standard and reduced conflict over resources between the state and the people.

Case studies have revealed that community-based forest management projects are crafted by outside actors via governmentality (Agrawal 2005; Li 2007). Unlike these studies, there are many cases in Thailand in which locals spontaneously initiated and practiced de facto community forest management. They later received assistance from NGOs, local academics, and forest officers to organize and institutionalize community forests with clear demarcation, written regulations, and management committees. It is true that in the process of establishing such community forests in a formal or institutionalized way, the actual design of community forests was affected by the power relationship—there were unequal amounts of expert knowledge between the locals and NGO workers or forest officials; NGO workers and officials were friendly with the locals in giving necessary advice. However, the expansion of community forests in Thailand since 1990 was fueled by the demands of locals facing resource scarcity and the necessity to protect their rights, and was approved by the Forest Department, influenced by the global trend to promote community-based resource management for sustainable use (Fujita 2011).

In the 2000s, contrary to this trend of sustainable forest usage, forests were invaded for rubber cultivation, especially in nontraditional cultivation areas such as the northeast region. The last remaining forests were converted into rubber gardens. Herbicide use in the rubber gardens polluted surrounding areas. Despite this, there were very few voices from government agencies, NGOs, or local entities demanding a halt or limit to the expansion of rubber. Society as a whole seemed to accept the rubber boom, with few conflicts between the state and rubber-growing communities.

II-2 Rubber and Agrarian Change in Northeast Thailand

Farmers in Thailand have been committed to a market economy for longer and more deeply than farmers in many other countries and areas. In Northeast Thailand, in particular, upland cash crops such as kenaf, cassava, and maize have been widespread since the 1960s (Pasuk and Baker 1995, ch. 2). Prior to the 1990s, however, cash-crop cultivation did not raise the socioeconomic status of poor Thai farmers (Rambo 2017). High volatility of crop prices, accompanied by a poor—or lacking—social safety net, kept

farmers socially marginalized and economically vulnerable (Hirsch 1990). Instead, as many previous studies (Rigg and Salamanca 2011; 2015; Rigg *et al.* 2014; Rigg *et al.* 2018) have argued, migrant work in Bangkok and other urban areas, as well as various non-farm activities, were long the main sources of cash income, while farming decreased.

Since the 2000s, due to the growth of global market needs, prices of industrial crops such as rubber and cassava have remained high. I observed in this study that rubber cultivators have become rich; they are able to purchase cars, tractors, and electrical appliances as well as daily food materials. Their children are able to attend college. They have never before experienced such an economic boom. The statistics also show that the average income in Ubon Ratchathani Province, where this study is located, almost reached the national average in 2011, but the gap subsequently widened following a decline in the price of rubber (Figs. 1 and 2).

Many previous studies that argued for agrarian change in Northeast Thailand dismissed the impact of the rise in crop price, probably because those studies were conducted in Khon Kaen and Maha Sarakham Provinces, where there was no remaining frontier land for upland crop expansion in the 1980s (Rigg and Salamanca 2011, 557; 2015, 300). However, other case studies in Khon Kaen Province reported a significant contribution of rubber cultivation to villagers' income, for both owners of rubber gardens and hired laborers (Patarapong *et al.* 2011; Uraiwan and Aran 2013).

Thus, the spread of cash-crop cultivation and its economic impact have not been

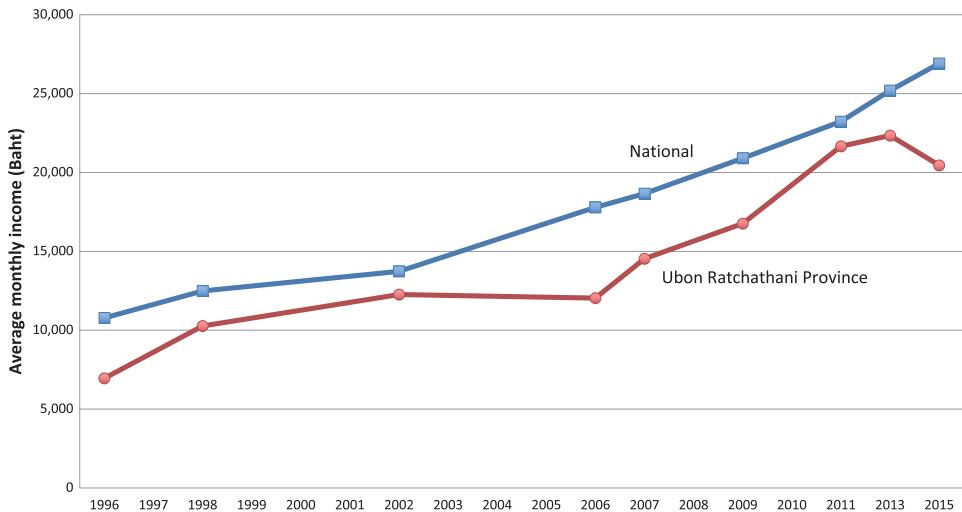


Fig. 1 Average Income: National and Ubon Ratchathani Province

Sources: Thailand, National Statistical Office (1996; 1998; 2006; 2007; 2009; 2011; 2015); Ubon Ratchathani Provincial Statistical Office (2002).



Fig. 2 Price of Rubber, 1997–2015

Source: Thailand, Office of Agricultural Economics (2015b).

uniform. The study site of this article was one of the most peripheral in terms of cash-crop cultivation. Cassava cultivation spread in the 2000s, at the same time as rubber. Before that, villagers' cash income derived mostly from migrant work in urban areas or miscellaneous wage labor around the village. Therefore, relatively rich natural forest resources were preserved, which allowed for a self-sufficient mode of life. Rubber, with its significant economic impact, not only replaced existing crop fields but also destroyed the scarce remaining natural forests.

II-3 *Assemblage*

These changes in rural areas of Northeast Thailand can be explained in terms of assemblages as follows: Since the 1990s, when the drastic policy change took place favoring sustainable forest management, including the establishment of community forests, the assemblage of farmers' livelihoods involved major factors such as unstable, insufficient crop prices; non-farming activities and migrant work in urban areas; and sustainable natural resource management. In the early 2000s, this assemblage was rearranged into the rubber boom assemblage, with the increase in rubber prices. In the cultivable areas in the Northeast, many farmers planted rubber seedlings, which began to provide their main income six or seven years later and allowed the farmers to avoid migrant work. Natural resource management remained within the assemblage, but as a less important element. In this process of assemblage rearrangement, did friction arise between con-

flicting elements, and if so, how was it resolved? Below, I examine actors' performances in detail, as part of a study in a village in Ubon Ratchathani Province.

III Study Site and Methodology

The arguments in this paper basically depend on field research in N village in Ubon Ratchathani Province and in surrounding villages. I have made regular visits to N and neighboring villages since 1997 and carried out ethnographic research on relationships between villagers' livelihoods and natural resource use. The description and arguments used in this article are based mainly on ethnographic data from participant observation prior to 2015, as well as questionnaire surveys conducted in 2012 and 2015, interviews with key informants in both Bangkok and the area around N village, and analyses of documents such as newspapers and websites.

Most villagers in N and surrounding villages are Isan people. N village is located adjacent to Pha Taem National Park, established in 1991. Around the village, the land is gently sloped. The lower lands are occupied by paddy fields, while the hilly area was once cultivated for upland rice by a form of shifting cultivation that had been abandoned for decades because of reinforced forest patrols against swidden practices after the establishment of the national park. The main form of subsistence has long been paddy cultivation, while various resources for daily living have been extracted from the surrounding natural environment, such as bamboo shoots and mushrooms from the forests, fish from the streams and paddy fields, and wild animals hunted in the forests. Unlike many other villages in the Northeast, cash crops such as cassava, maize, and kenaf had seldom been cultivated until cassava cultivation began in N village and the surrounding area in the 2000s. In 1997, to secure the natural forests for sustainable use, the villagers designated the hilly forest area in the village as a community forest and institutionalized regulations and organization for its management.³⁾

Rubber cultivation began to expand rapidly in the village in the early 2000s, in line with the general trend in Northeast Thailand, although some farmers had practiced it before. Large parts of private forests were cleared and converted to rubber gardens as well as cassava fields.

Countrywide, about 90 percent of newly planted rubber gardens from 2003 to 2014 were converted from low-vegetation areas, probably crop fields, while only about

3) The establishment of N village's community forest in 1997 was de facto, with approximately 80 percent of villagers in agreement, while its formal establishment, with complete agreement, was in 2002.

10 percent were converted from natural forests (Hurni and Fox 2018, 209). Sorat Praweenwongwuthi *et al.* (2017) reported higher percentages: 827 ha out of a total of 1,353 ha of rubber gardens planted in Mueang District between 2006 and 2010 were converted from natural forests, as were 1,312 ha out of a total of 5,498 ha in That Phom District, Nakhon Phanom Province. These data show that in some areas, conversion to rubber gardens caused much more severe deforestation compared with the general trend. Only 10 percent was enough to damage the last remaining natural forests, including rich natural ecosystems, in some protected areas.

According to a questionnaire survey in N village in 2012, 59 of 109 households had rubber gardens occupying 664 rai within the village, while in 2015, 131 of 144 households had 973.3 rai.⁴⁾ In 2012, only 17 of 109 households still maintained secondary forests adjacent to farmlands, called *pa hua rai plai na*, of their own, totaling 88 rai. Fig. 3 shows the years of cultivation and planting of rubber seedlings, covering 417 rai out of 664 rai in 2012. Forest clearing preceded the planting of rubber seedlings, because the villagers tended to cultivate cassava for several years before planting rubber. Both clearing of secondary forests and planting of rubber seedlings increased markedly after 2003.

The community forest was well conserved, partly because the villagers respected their own regulations and partly because a large part of the community forest was located on rocky land that was unsuitable for cultivation. The expansion of rubber gardens accompanied various changes in the environment. On the one hand, it pushed people into a more convenient, consumption-based lifestyle by providing cash income; and on the other, it discouraged them from natural resource extraction, such as fishing and wild mushroom gathering, due to chemical pollution and decreases in natural resources. There were also changes in villagers' daily lives. Some of them may have once considered preventing resource degradation by regulating herbicide use; in the new reality, however, they tried instead to adjust their social and customary order of open access to natural resources regardless of landownership to the new conditions brought about by rubber cultivation in which landowners could prohibit access to natural resources.

Indeed, a large proportion of the rubber gardens and cassava fields did not have any land title, with the exception of enduring farmlands that had So Po Ko 4-01 titles or those recently investigated by forest officers and qualified to be given So Tho Ko titles.⁵⁾ In fact, the recent clearing of forests was mostly illegal. The land was all located outside the national park. Thus, the park guards did not monitor the villagers' agricultural activ-

4) 1 rai equals 0.16 ha.

5) Both So Po Ko 4-01 and So Tho Ko are limited land titles giving cultivation rights but not rights for sale and mortgage. The former title is issued by the Agricultural Land Reform Office, while the latter is issued by the Royal Forest Department.

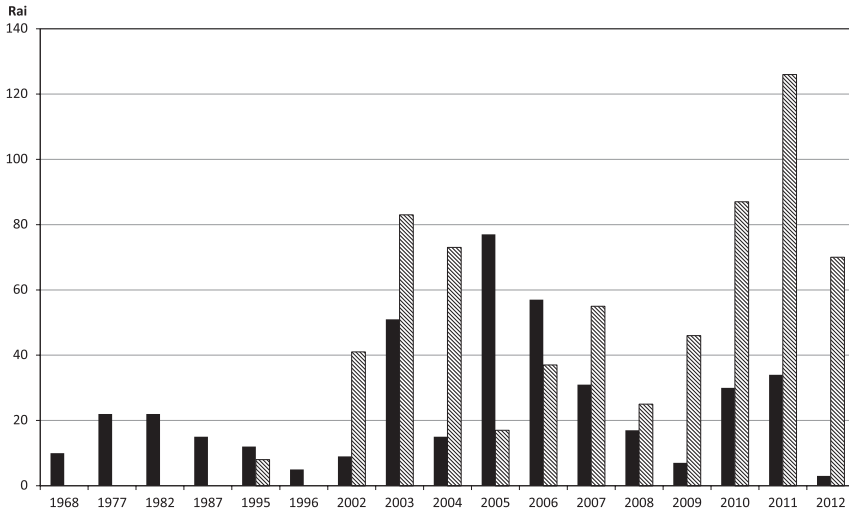


Fig. 3 Clearing and Planting of Rubber Trees

Source: Questionnaire survey, 2012.

Note: Unshaded bars show the area of clearing that is current rubber gardens.

Shaded bars show the area of rubber planting.

ities. The forest protection unit (*nuai pongkan raksa pa*) located near the village, and other forest authorities in charge of managing national forestlands outside the park, overlooked the villagers' clearing of the forests, as the officers understood the need for them to do so to generate a livelihood. NGOs, including one that had committed to promoting the establishment of community forests in this area and to assisting the villagers, also did not publicly alert the authorities or rubber cultivation smallholders to the environmental damage. In that sense, the governmental authorities, villagers, and probably NGOs all supported the rubber boom. In the following sections, I will examine in detail the context of the rubber boom and the responses of each actor to it.

IV Development of the Rubber Boom

IV-1 Rubber Promotion Policy

In the past, rubber cultivation was limited to the southern and eastern parts of Thailand. Except for a negligible number of people who had experience working as rubber tappers in the South and had begun to cultivate the crop earlier, major cultivation in the Northeast did not begin until 1989, when the government initiated a rubber promotion policy. Arak, an officer at the Rubber Research Institute, under the Department of Agriculture,

reported that the government began to consider promoting rubber in the Northeast and North in the late 1970s. During that period, Malaysian plantation companies decided to switch from rubber to palm oil (they executed these plans in the early 1980s) due to the continuing low price of rubber. However, the Thai government anticipated a shortage in rubber supply and sought new areas for rubber cultivation in the North and Northeast. First, an experimental plantation was started in the newly established Chachoengsao Rubber Research Center.⁶⁾ Seeing the successful results of the experiment, the government started a rubber promotion policy in 1989, the first phase of which continued until 1996 and resulted in approximately 280,000 rai being brought under cultivation in the Northeast. The promotion of rubber in this phase aimed at reforestation as well. The following phase, from 1997 to 2001 (and then extended), targeted an additional growth area of 200,000 rai and a total cultivation area of 800,000 rai (*Phu chat kan rai wan*, March 10, 1997; *Matichon*, April 4, 2001). Two further phases, in 2003–6 and 2011–13, set more ambitious targets of an additional 1 million rai (700,000 rai in the Northeast and 300,000 rai in the North) and 800,000 rai (500,000 rai in the Northeast, 150,000 rai in the North, and 150,000 rai in the central region) respectively (*Khao sot*, June 14, 2003; *Deli niu*, October 8, 2009; *Krungthep thurakit*, January 15, 2011; Yuphin 2013). In each phase, the promotion project provided participating farmers with rubber seedlings at no cost and low-interest loans to support expenditures until rubber began to be harvested.

IV-2 *Difficulties in the Initial Phase*

The rubber promotion policy was not effective, especially in the initial phase. For example, the second phase, 1997–2001, targeted a 200,000-rai increase in cultivation area. Because the target was not achieved within the planned period, the project phase was extended (*Matichon*, April 4, 2001). The rubber price was as low as 20 baht per kilogram until around 2002–3. More important, most farmers in the Northeast were skeptical that rubber could grow in their region, where natural conditions such as weather, moisture, and soil differed significantly from those in the South.

Panya Woraphithayaphon, who had been working to promote rubber cultivation as a staff member of the Office of Rubber Replanting Aid Fund in the Northeast since 1987 and was the director of the Ubon Ratchathani branch office in 2013, reported that it took five years (1987–93) for him to convince farmers to cultivate rubber. Farmers in this region tended to think in the short term. They were also likely to be easily convinced by rumors without verifying facts for themselves. Thus, in the initial period, a rumor was spread throughout the region that said “If you plant rubber trees, what comes out is

6) Interview with Arak Chanthuma, Rubber Research Institute, March 26, 2014.

tears (*nam ta*), not latex (*nam yang*),” metaphorically saying that rubber could not grow well in the Northeast and that farmers would suffer. Actually, latex was harvested in the research center in Nong Khai, demonstrating that rubber could grow well in the Northeast. However, farmers at that time were not easily convinced.⁷ In the same way, a newspaper reported that a village headman in Mukdahan Province who planted rubber and tried to encourage other villagers to do the same was called a fool (Suchat 1998).

IV-3 Rubber Boom

Farmers in the Northeast began to plant rubber enthusiastically around 2002–3 (Fig. 4), when the Thaksin government adopted the accelerated rubber promotion policy often called the “1 million rai project.” It is true that the government made a significant policy shift to boost the target to an additional 1 million rai of cultivated area and that the Thaksin government needed to revoke a previous cabinet resolution that limited the rubber cultivation area in the whole country to not more than 1.2 million rai (*Khao sot*, May 9, 2003). Expecting the project to lead to improvements in living standards, many people formed long queues to join the project (*Phu chat kan rai wan*, July 12, 2007; *Krungthep thurakit*, January 15, 2011). However, the government’s project was not the

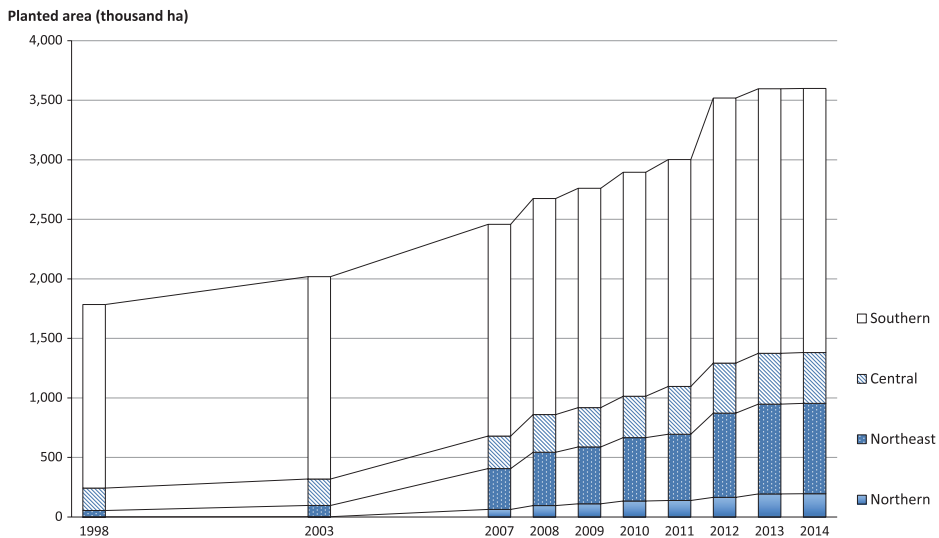


Fig. 4 Expansion of Rubber Cultivation Area by Region

Sources: Khana Kamakan Nayobai Yang Thamachat (2010); Thailand, Office of Agricultural Economics (2010; 2012; 2015a).

7) Interview with Panya Woraphithayaphon, ORRAF Ubon Ratchathani branch office, March 1, 2012.

main driving force behind farmers planting rubber. Farmers planted many more rubber trees without any support from the project. Of the 4 million rai increase in rubber cultivation area between 2003 and 2009, 3.2 million rai were planted spontaneously through farmers' own investments (Saran 2011). The government's project was so problematic that it did not fully benefit farmers. The production of seedlings could not keep up with demand. Seedlings arrived too late in the season for planting, in insufficient numbers, and were of poor quality. Additionally, corrupt politicians were involved in the process (Saran 2011; *Phu chat kan sut sapda*, April 23, 2011).

Northeast farmers' attitudes during this period were reported in the mass media. For example, a daily business paper reported that in one village in Nong Khai Province, migrants from the South purchased land from local inhabitants for rubber cultivation. However, in another village in Loei Province, villagers refused to sell their land to outsiders because they wanted to plant rubber themselves. Farmers in the Northeast "woke up" to rubber in 2002–3 (*Krungthep thurakit*, December 24, 2005). Furthermore, in the following years, seeing a sharp increase in rubber price—up to nearly 100 baht per kilogram (Fig. 2)—farmers formed long lines to join the project. The project could not provide enough seedlings to distribute to participating farmers, while other farmers obtained informal loans at high interest rates to pay the initial costs of rubber cultivation (*Phu chat kan rai wan*, July 12, 2007).

The research site also followed this trend. Rapid expansion of rubber cultivation began in 2003. Rubber was first cultivated in this area in 1989, when a few retired teachers migrated to P village, next to N village. In 1990 about 10 more P villagers began cultivation, with the support of a project by an NGO, the Progressive Farmers Association. N villagers began to cultivate rubber around 2000. From 2003, following the rubber price increase, rubber cultivation increased. N villagers made their decision to plant rubber not only due to the price in the market; they also saw that those who had planted rubber before them were doing well. They learned that rubber grew well in the area and could reward them with enough income to support a livelihood without working in Bangkok, to buy a pickup truck and a tractor, and to build a new house. Such firsthand learning about the success of their neighbors effectively pushed the villagers into rubber cultivation.

It was not only farmers who rushed into rubber. Noi, a policeman at the nearest police station, bought land from a local farmer in 1995 and planted rubber in 2005 and 2009. He managed his rubber garden by hiring labor from neighboring villages. In fact, most of the staff at the police station had rubber gardens. This was true of other public officials, such as school, forestry, and district office personnel. Moreover, many from the South purchased land for rubber gardens. The community forest of C village, next to

N village, was cleared illegally by a man from another district to plant rubber. A young girl in N village, whom one of my friends knew, was married to a rich man from the South who managed rubber gardens.

The following were all elements of the rubber boom assemblage: experimental plantations in Northeast Thailand, the fact that rubber could grow in Northeast Thailand, the rubber promotion policy of the government, increases in the price of rubber, and the economic success of the growers. In this context, empirical events such as seeing neighbors rush to plant rubber and their improved living standards were core elements that directly affected farmers, with the result that they wanted to plant more rubber.

The price dropped after 2012, as shown in Fig. 2, to around 40 baht per kilogram. However, in 2013 I still observed N villagers planting rubber; and, as reflected in questionnaire surveys, there was a higher percentage of rubber-growing households in 2015 than in 2012, as shown in Section III. In 2014 and 2015 villagers no longer planted rubber, and most of the seedling suppliers near the village disappeared or ceased to do business. Villagers who had already begun to harvest latex reported that they could tolerate the low price.

The rubber boom has passed. Rubber is at the center of farmers' livelihoods. The rubber boom assemblage has transformed into a more stable assemblage.

V Ecological Changes due to Rubber

V-1 *Damage to Protected Areas*

The rapid expansion of rubber cultivation was inevitably accompanied by ecological changes. As discussed above, the promotion of rubber cultivation was aimed initially at rehabilitating degraded forestlands. Northeast Thailand in general had experienced severe deforestation until the 1980s due to agricultural expansion, which involved both self-sufficient paddy cultivation and cash-crop cultivation of plants such as maize, cassava, sugarcane, and kenaf. Replacing the fields with rubber was considered much better because rubber gardens could cover the surface of the land so that soil erosion could be prevented and moisture preserved (Wichit n.d.). In fact, in some places rubber did come to replace existing crop fields in the way that the project originally assumed. For example, in Loei Province many farmers converted swidden to rubber gardens, which was reported as a shift to sustainable agriculture (*Khao sot*, June 8, 2000).

However, it was revealed that rubber cultivation caused much more deforestation than forest rehabilitation in some areas. National forestlands, including protected forests such as national parks and wildlife sanctuaries, were illegally encroached on and cleared

for rubber cultivation. In the Northeast, probably the biggest deforestation case was that of 1,250 rai in Thap Lan National Park, in Nakhon Ratchashima Province, while in Ubon Ratchathani Province a case was exposed in the Buntharik-Yot Mon Wildlife Sanctuary (Phongphon 2011). It was not only locals who were engaged in the illegal cultivation of supposedly protected forests. Businessmen, mostly from the South, bought land that the locals cleared. A case in Loei Province involved businessmen buying local people's land with So Po Ko 4-01 deeds, which could not be legally sold, by formally claiming them to be "rentals." Other businessmen who could not buy So Po Ko 4-01 land employed local inhabitants to clear the forests illegally. The fee for the land clearing would be paid about two years after the planting of rubber seedlings. In the event of subsequent official exposure, the businessmen insisted that they bought land that had already been cleared by the local population. In this way, businessmen invaded protected areas step by step (Wichai 2006). A similar problem was reported in Nong Khai Province (*Krungthep thurakit*, December 24, 2005). Destruction of protected areas by rubber cultivation was not limited to the Northeast. Even in the South, where rubber had long prevailed, cultivation expanded further in ways that endangered the final enclaves of the Sakai hunter-gatherer people in the remaining patches of protected areas (*Krungthep thurakit*, June 9, 2011).

V-2 *Degradation of the Living Environment*

N villagers did not have conflicts with the national park, as they were not adjacent to it, although farmers near the boundary and in the inner villages allegedly practiced illegal cultivation of rubber and other cash crops within the protected area. However, even outside the national park, degradation of the living environment was a serious problem.

Most of the rubber gardens, 973.3 rai according to the questionnaire survey in 2015 (as shown in Section III), were converted either directly from secondary forests called *pa hua rai plai na*—literally meaning forests fringing paddy fields—owned by individual villagers or following some years of cassava cultivation. Thus, that total area of forest disappeared, mostly in the last 15 years. Many villagers naturally pointed out that due to the conversion of *pa hua rai plai na* forests to rubber gardens, the source of natural food materials had declined and they had to rely more on the community forest that was still conserved by the villagers.

Some villagers attributed the flooding of the Huai Se—a small river running through the village—that affected the village almost every year after 2010 to the loss of forests due to rubber cultivation. There was an argument against this, however: according to some elders, there had been more severe floods in the past, when rubber was not planted, before the river was ever dredged to prevent floods—so the floods were not necessarily

caused by deforestation.

What was more shocking, and more talked about by the villagers, was contamination by herbicides. In rubber gardens weeds proliferate, especially in the five years between the planting of seedlings and the closure of the crown. Weeding in this period is thought to be critical for growing the rubber seedlings and is reflected in the harvest. Villagers, therefore, sprayed herbicides once or twice during the five years. One application of herbicides could keep a garden free of weeds for a few years. At the same time, however, the herbicides widely contaminated the villagers' living environment. After being sprayed in the rubber gardens, they flowed into neighboring land with rainwater. In the early 2000s, the villagers were shocked by an incident in which an old woman was killed by herbicide poisoning after eating wild mushrooms that she collected from the villagers' own secondary forests adjacent to the rubber garden. Previously, the villagers had not been familiar with chemical contamination. However, after this incident they became nervous about herbicides. Now, the middlemen who buy wild mushrooms that the villagers collect accept only mushrooms from the community forest, located on higher land and thus thought to be free from contamination. Some villagers reported that they had seen many dead fish in the stream. Others said that they could no longer collect edible plants along the side of the street and eat them as they had done before the expansion of the rubber gardens. Even though the villagers felt threatened by herbicides, they could not regulate them. Thus, a general and broad anxiety prevailed regarding their living environment as a whole.

Additionally, a number of resources are disappearing due to the chain of changes in livelihood ecology. For example, *phak kadon*, the shoots of the *Careya sphaerica*, which were among the most popular wild vegetables in Northeast Thailand, are now difficult to find. The kadon is a tree that typically grew on the dikes of paddy fields. Villagers were likely to conserve kadon trees that naturally grew from seeds. However, recently it has become common for villagers to use large tractors in paddy fields. These tractors plow too deeply for kadon seedlings to germinate. Cow manure is also hard to find in the village now. The villagers once raised many cows and buffaloes. However, the expansion of rubber gardens has made it difficult to herd cows and water buffaloes that might eat or fell young rubber trees. Since most villagers have abandoned cattle grazing, they have to buy manure to make organic fertilizer. Such a causal chain of events related to rubber has been transforming the living world of the villagers, step by step. It is also changing their lifestyles, as shown in the next subsection.

A similar situation was reported in the Dong Khum Kham and Dong Phu Kham forest area, in the same district as N: rubber cultivation destabilized the villagers' subsistence basis, leading to conflicts among villagers over natural resources (Samakhom

Pa Chumchon Isan n.d.). In the Dong Saramoen forest area, also adjacent to N village, rubber cultivators even destroyed the community forest.⁸⁾ In both areas, villager groups had been making efforts to encourage sustainable resource use. However, they did not prevent the cultivation of rubber.

V-3 *Changes in Lifestyle*

Income from rubber cultivation in N village was estimated at 10,195 baht per rai in 2014, after the sharp drop in rubber prices.⁹⁾ Although initial investments and costs until the beginning of harvesting must be considered, this income would be enough to support basic everyday consumption. In fact, in past years the price was as high as 100–180 baht per kilogram, which was more than two to four times the current price. Thus, some villagers could buy new cars and tractors and build new houses. Their children were able to receive at least a high-school education and, if they wanted, college. In parallel with the degradation of villagers' living environments, as shown above, the high price of rubber caused the villagers' lifestyles to change.

The increasing penetration of a cash economy is apparent in both daily consumption and livelihood work. Villagers hire more labor and use machines for farmwork, buy more food materials, and use less resources from the surrounding natural environment. The continuing high price of rubber has partly facilitated their change of lifestyle to one oriented to a market economy.

Regarding the hiring of labor, some villagers reported that they currently hired much more labor for paddy cultivation, such as transplanting and harvesting, so as to finish it in the shortest time and minimize the loss of rubber harvesting time. However, the results of the questionnaire survey in 2015, containing questions on expenditures for paddy cultivation, were not consistent with this. The average expenditure for hired labor per rai of paddy cultivation in 2014 was 540.7 baht for the 38 households who answered that they had rubber gardens to harvest, whereas it was 636.8 baht for the 72 households who did not (the other 34 households did not answer). This contradicts the villagers'

8) Personal communication with members of the Dong Saramoen Forest Network.

9) The questionnaire survey in 2015 was partly unsuccessful, as many villagers were unable to quantify the cost of rubber. The calculation was as follows: In N village, 48 households of a total of 144 held rubber gardens already harvested at the time of the survey in July and August 2015; the rubber trees were eight or more years old. Assuming the annual average harvest per rai in Ubon Ratchathani Province to be 215 kg, following the latest available statistics (Thailand, Office of Agricultural Economics 2015a, 98), the average price of unsmoked rubber sheet in 2014 was 53.93 baht (Thailand, Office of Agricultural Economics 2015b), and fertilizer use was 500 g per tree for 70 trees on 1 rai. In the Si Muang Mai District town where most villagers bought fertilizer, the cost of fertilizer was 700–1,000 baht per 50 kg, depending on the brand; assuming it to be 1,000 baht, the income per rai of rubber garden was estimated to be 10,195 baht.

explanation that those who had rubber to harvest put more effort into finishing other farmwork.

Regarding sources of food materials, many villagers reported that they bought more daily food materials than in the past because, as they explained, those who had rubber gardens to harvest did not have the time or energy to go hunting, fishing, or gathering after finishing the tapping and harvesting of rubber at night. In the past, especially before there was much rubber cultivation, few foods were purchased; most were extracted from the natural environment or planted/raised. The questionnaire survey in 2015 contained questions about sources of daily food materials other than rice, asking about the ratio extracted from nature versus planted/raised and purchased, both in 2015 and in 2000. The answers were not intended to show the real sources of foods but rather to explore the villagers' understanding of the subject. The results (Table 1) simply do not support the villagers' explanations.

In 2000, the three households that had already begun to harvest rubber showed higher ratios of purchased and planted/raised food with a lower dependence on nature.

In 2015, those who had started to harvest rubber depended more on the market economy than did those who had not yet begun to harvest rubber. Additionally, not only the former but also the latter showed a higher percentage of purchases in 2015 than in 2000. In other words, dependence on the market economy increased as a general trend regardless of villagers' engagement in rubber cultivation. Rubber provided income opportunities not only for cultivators but also for those who did not have their own harvest, because more labor was required either for paddy cultivation or for work in rubber gardens.

These negative or controversial events are also elements of the rubber boom assemblage, causing ecological degradation on the one hand and making lifestyles more market dependent and separated from nature on the other. The rubber boom proceeded.

Table 1 Villagers' Perceptions of Food Sources in 2000 and 2015

		2000		2015	
		Rubber Harvest (3 households)	No Rubber Harvest (113 households)	Rubber Harvest (47 households)	No Rubber Harvest (82 households)
Rainy season	Purchased	36.0%	19.7%	55.0%	50.4%
	Raised/planted	33.0%	28.1%	21.4%	18.6%
	Wild	31.0%	52.2%	23.6%	30.9%
Dry season	Purchased	38.0%	21.9%	61.8%	55.8%
	Raised/planted	33.0%	25.1%	19.7%	17.9%
	Wild	29.0%	53.0%	18.4%	26.3%

Source: Questionnaire survey, 2015.

VI Outside Actors

VI-1 *Government Policies and Implementations*

The continuing high rubber prices created the conditions for a rubber boom, in which people were influenced by the rich consumer lifestyle enjoyed by others who had profited from rubber cultivation. As an almost inevitable side effect of this rubber boom, forest destruction and other related environmental changes occurred. Many actors, government authorities, NGOs, and local entities were involved in this process. However, all of them tended to adapt to the rubber boom, except for occasional strong measures to violently evict farmers from forestlands by forestry officials.

With respect to government authorities, the development and extension of rubber cultivation is the responsibility of the Rubber Research Institute, the Office of Rubber Replanting Aid Fund (ORRAF), and partially the provincial/district agricultural office. The Office of Agricultural Economics is also involved in policy making, especially as Khana Kamakan Nayobai Yang Thamachat (Natural Rubber Policy Committee) is headed by the vice prime minister.

Those authorities, directly committed to rubber policy in terms of agricultural development, seemed little concerned about environmental issues. Basically, the government's scheme of support for rubber cultivation in the Northeast, planned and funded by the Ministry of Agriculture and Cooperatives and implemented mainly by ORRAF, officially required that only lands having legal title were eligible for support. The Progressive Farmers Association, the first organization to carry out a rubber promotion project around the research site in 1989, also had the same regulation. However, according to an ORRAF officer in the Ubon Ratchathani branch, the district/provincial agricultural office implemented part of the promotion project, in which, despite the official guidelines, it granted support to lands without legal title, which might also have included recent illegal, encroached lands. The ORRAF officer further reported that ORRAF had also endorsed lands without titles to be supported by the project, under pressure from a parliament member petitioned by the farmers. Once planted, supported by the project or not, having land title or not, rubber gardens could all be registered with ORRAF, so that replanting could be funded by ORRAF.

There remains the view, although it is not widely held, that rubber contributed to environmental improvement. Montri Kosalawat, secretary-general of the Progressive Farmers Association, stressed that rubber gardens provided fuelwood that could substitute for timber from the forests.¹⁰⁾ Sukhum Wong-ek, the director of the Rubber Research

10) Interview with Montri Kosalawat, July 29, 2014.

Institute at the end of 2007, also stated that rubber could substitute for green forests because it could create a moist environment and enrich the land much more than many other crops (Phanphichaya 2007). Officers in charge of rubber at the Office of Agricultural Economics were astonished when I told them that many natural forests had been converted to rubber gardens, because they thought that rubber had replaced other annual crops, not natural forests. A ranking officer of the Rubber Research Institute was of the opinion that rubber should be planted on suitable land that did not include previous paddy fields, steep slopes, or national forest reserves. He did not want villagers to burn the forests and believed degradation of forests through rubber cultivation was not beneficial to villagers.

VI-2 *Foresters' Dilemmas*

Conservation of natural resources is the responsibility of the Royal Forest Department for land outside protected areas, and the Department of National Parks, Wildlife, and Plant Conservation (National Parks Department) for protected areas. These departments did not effectively prevent the conversion of forests to rubber gardens. As shown above, even protected areas were invaded. As organizations, they were caught between their legally required task of conservation and favoring a social climate geared toward rubber. In 2007 it was revealed that the National Parks Department was ready to submit a report on the illegal occupation of national forest reserves to the minister; the director general of the department pointed out that the government's rubber promotion policy had caused illegal occupation and cultivation of national forest reserves. He added that officers felt pressured because the initiation of legally correct measures would have gone against government policy, and therefore they could not strictly control and protect the forests. Because of this situation, many officers resigned. The director general questioned whether society would accept the disappearance of protected forests. He stressed that society should make that decision, otherwise the department alone could not conserve the forests (*Matichon*, July 13, 2007).

There is no clear evidence that the government prioritized the expansion of rubber cultivation over nature conservation. However, as the director general pointed out, the officers perceived such a sentiment spreading through society and believed that the government would favor it. Forest clearing was overlooked also in N and surrounding villages, as shown below, mainly due to local officers' sympathy with the villagers. It was also reported that some corrupt officers took part in illegal encroachments. In a case in Kanchanaburi Province, brought to light in 2011, it turned out that officers, including some from the Royal Forest Department, the Department of Land, and the Department of Local Administration, had illegally "sold" national forestlands to investors from the

South for rubber cultivation. After an investigation, the Royal Forest Department decided to transfer 12 officers and established a hearing committee (Chanchira 2011). Apart from this scandal, a forestry officer working in Ubon Ratchathani, a close friend of mine, told me that officers in the Forest Protection Unit accepted bribes from farmers to overlook illegal clearing of forests for rubber cultivation. More than simply bowing to social sentiment, some forest officers positively took advantage of the rubber boom.

However, there were eventually several campaigns against illegal encroachments of national forestland and, in particular, protected areas. The most well known was during 2011–12, when Damrong Phidet was the director general of the National Parks Department. As well as physically destroying resort hotels that were illegally constructed and operated by powerful businessmen in Khao Yai National Park, Damrong ordered strong measures against illegal rubber gardens in a way that had rarely been done under previous directorships. In Buntarik District, Ubon Ratchathani Province, villagers cultivated rubber in a wildlife sanctuary. They resisted officers by blockading roads. Finally, the director of Samnak Borihan Phuen Thi Anurak Thi 9 (Ubon Ratchathani) (Protected Area Management Office 9 [Ubon Ratchathani]), under the National Parks Department, sent the officers under his control out at dawn to destroy all rubber gardens as quickly as possible and to return before the road was blockaded.¹¹⁾ In 2015, the current military government also ordered that all rubber trees in the protected areas must be removed by the end of July. Otherwise, the officers in each protected area—national park or wildlife sanctuary—would destroy them. As I observed in a village in Pha Taem National Park, this order was implemented. However, such strong measures were not taken on a regular and systematic basis and so did not change the social sentiment generally supporting the rubber boom.

VI-3 *Local Administration and NGOs*

What was remarkable when considering ecological changes due to rubber, especially in comparison with previous local environmental movements—such as those concerning anti-logging efforts and community forests—was the lack of commitment by environmental NGOs, both national and local. In previous times, they had supported local movements seeking sustainable natural resource usage. However, in the face of apparent threats to local environments, as shown above, almost all the NGOs kept quiet. On the other hand, at the research site there were some local initiatives toward more balanced resource use, although none of them disallowed rubber. Officially, local municipalities, Tambon Administrative Organizations (TAOs), adopted policies that called attention to

11) Personal communication with an officer of the Protected Area Management Office 9.

the environment and supported conservation actions by villagers. Both NT TAO, to which N village belongs, and NP TAO, of the adjacent subdistrict, had presidents with a background of working in local community forests. Both supported villagers' activities regarding the maintenance of community forests in terms of budget allocation. However, this was a small part of the total budget, and both presidents naturally had to respond to the various needs of the people. NT TAO also organized a training course on rubber cultivation for the villagers.

A more evident and concrete initiative was the "family forest" project, *pa khropkhruea*, largely carried out by Lom, ex-president of NT TAO. He undertook this project before he was elected as the TAO president. Lom had grown up in a different province. After graduating from university he joined a local NGO, Nature Care, as a volunteer and later became a staff member. His task was to advise local people on the establishment of community forests and to organize an inter-village network. Even after leaving Nature Care, Lom remained in the area and worked as an adviser for the villagers' community forest network. Although the network organization became inactive for several reasons, Lom obtained funds from UNDP and implemented the project with his staff in 2008 and 2009. This project helped villagers to make parts of privately owned *pa hua rai plai na*, secondary forests adjacent to farmlands, into "family forests," *pa khropkhruea*, with clearly demarcated boundaries and written regulations established at participants' meetings in each village. Although the project targeted 100 participants in NT and NP subdistricts, it attracted more than 150, whose family forests totaled 1,076 rai. Throughout the project, participants seemed well aware of the importance of family forests, even though the number of participants was limited. With the exception of one household with nine participants in N village, eight households who preserved family forests in 2010 still do so. This project, as shown later, reflected a change in the villagers' mindset regarding natural resources.

As shown above, the attitudes varied by organization due to administratively or socially assumed roles. However, one thing they had in common was that they did not act negatively against rubber cultivation. The social climate that required prioritization of the economic benefits of rubber was so strong that the director general and other officers of the National Parks Department assumed that it was an unspoken government policy and hesitated to strictly follow the laws. At the local level, officers were sympathetic toward the poor villagers trying to improve their economic status through rubber, and so did not regulate rubber cultivation. This nationwide social climate resonated with the farmers' hopes at the grassroots level. The actors were agents of such a social climate while they simultaneously held on to the contradictory position of sustainable forest management, which was suppressed or represented only in an indirect way, as in the

family forest project. In this way, conflicts between the elements within the rubber boom assemblage were internalized in each actor.

VII Villagers' Adaptation

VII-1 *Attempts to Moderate Ecological Changes*

Facing the ecological changes described above, N villagers at least recognized the problems and considered ways to solve them. Indeed, the regulation of a community forest for the village, established through village meetings, contained a provision that prohibited clearing without the permission of those with private forests. This provision could be a tool to prevent the extreme expansion of rubber cultivation. However, the villagers' understanding seems to have been vague. For example, the head of the village community forest almost forgot the rule, stating that according to the regulations of the community forest, felling trees in private forests, unlike community forest, did not require permission. However, the *kamnan* (subdistrict headman), recognizing the provisions of the community forest regulations, reported that villagers in the subdistrict, including N village, would inform him before clearing private forests. He would check on site to see whether there were large trees and send a report to the Forest Protection Unit so that clearing would be overlooked because the officers understood the villagers' need to do so for their livelihood. He explained that if he found a rich forest with large trees, he would refuse to report it to the Forest Protection Unit and persuade the holder not to clear it.

From the time he took the position in January 2011 until I interviewed him in 2012, the *kamnan* had heard reports of more than 50 cases in the subdistrict. Some of the cases had been rejected, although he did not remember the exact number. However, in fact, not all villagers informed the *kamnan* in advance of clearing private forests. In the questionnaire survey in 2015, of the 36 households that had cleared forests after 2000, lands that were currently rubber gardens, 16 households answered that they had informed the *kamnan*, 1 answered that they had directly informed the Forest Protection Unit, 13 households said they had not made any report, and the other 6 did not respond. Furthermore, of those who answered that they had informed the *kamnan*, four households answered that they had cleared secondary forests with large trees or primary forests. This shows that even the *kamnan*'s guidelines could not be implemented completely. The *kamnan* himself had to loosen the standards because villagers had the idea that they could cultivate their own land in any way allowed in the local customary context. The *kamnan* could not enforce anything beyond the customary rules that might be maintained

or modified by the villagers' consensus. He could refuse to talk to the Forest Protection Unit and overlook uninformed cases, but he could not punish the villagers.

In this regard, any modification or addition to village custom needs majority approval, although there is no institutionalized process for this. The establishment of the community forest is a typical example. The community forest organization and regulations were established through a series of village meetings, to which all villagers were invited. The process of establishing the community forest was formally organized with forest officers' assistance. Consensus could be promoted in informal ways. The regulation of rubber cultivation and related activities has not reached a consensus. For example, some villagers would like to regulate the use of herbicides. However, one explained it was impossible to regulate herbicide use through the villagers' own initiatives because people from outside had bought land in the village and would not comply with group directives. However, this explanation is not reasonable because there has never been any explicit attempt to regulate herbicide use, even among the villagers, although some villagers individually made decisions not to spray herbicides because their lands were near residential areas. The villagers have overlooked the issue of contamination in the interest of convenience regarding their own rubber cultivation.

VII-2 *Increasing Concern about Rights*

With the rapid ecological changes, villagers' concern about rights over resources, particularly private forests, has increased. Some have attempted to enclose their own resources and exclude others. The custom was that everyone could take wild resources from anyone's land. For many years, extracting timber from private forests without permission from the owner has been prohibited. However, collecting mushrooms and bamboo shoots, for example, has been considered open to anyone. This situation is now ambiguous.

The family forest project, described above, reflects the villagers' conflicted attitudes. Each participant was given signboards to place at the entrance of the family forest, showing the regulations for family forests. At a glance, this project merely encouraged owners to consider sustainable resource use, and thus, as some villagers suggested, its target seemed to be vague. However, in fact, this project contained important modifications of village customs, because the regulations—collectively established through village meetings and commonly applied to all participants within the village—included provisions that persons other than family members were not allowed to enter or extract resources from a family forest without permission. Moreover, penalties were specified. These were significant changes in custom. However, unlike the regulations for community forests, which most villagers respected because of their passage through village meet-

ings, participants in the family forest project seemed hesitant to respect family forest regulations. The discourse and actions of the villagers in relation to family forests remain ambiguous.

When I interviewed a *kamnan*, Khon, in 2010, he stated that despite the regulation of family forests, collecting mushrooms and bamboo shoots in others' forests was not prohibited because all villagers were living in cooperation with each other. Sommai, a participant in the project, stressed that he had the right to conserve his own forest by himself. He stated that he could overlook his relatives freely collecting resources. However, I found that he did not put up a sign setting out the regulations. He explained that he had previously put it up at his family forest, but he kept it in his house now because he wondered whether the sign would be damaged by exposure to wind and rain. He insisted that he would put it up again when officers came to inspect it so that he could show he was conserving the forest in the way the regulations stipulated. Rin, another participant, told me that he put up the sign at his family forest. However, this was not true. In fact, no participant in N village put up the sign.

Each village operated under different conditions. For example, in Na Thoi, neighboring N village, some participants did put up signs showing almost the same regulations as those for N village, although all villagers apparently understood that, contrary to the regulations, collecting mushrooms and bamboo shoots was open to anyone. One participant in Na Thoi reported that although other villagers had extracted timber from his forest before, after the project was launched they came to ask permission in advance. Thus, the project substantially strengthened owners' control of family forests.

VII-3 *Changing Customs*

Regardless of the family forest project, among N villagers the idea has been spreading gradually that natural resources should be extracted from one's own forests. When I interviewed an assistant of the *kamnan* at that time (and the current *kamnan*), Sit, in 2010, he reported that villagers collected bamboo shoots and fuelwood from their own forests, and that if they entered another family's forest they needed to get permission from the owners. Mushrooms, however, were still open to all because mushrooms went bad quickly. According to him, this change in custom had been established since around 2002, when the community forest was formally established. Sit's explanation was contradicted by Khon. Khon, the *kamnan* at that time, showed a more formal understanding, while what was actually happening was as Sit suggested. In other words, the change in custom was still too uncertain to formally enforce it among all villagers. As proof, one villager who had converted all his forests to rubber gardens did not hesitate to gather mushrooms and bamboo shoots from other families' forests. However, nobody formally

complained.

In 2013, I was astonished by the accounts of a number of different witnesses. One villager told me some villagers had prohibited others from collecting mushrooms and bamboo shoots in their forests for two to three years, because they were afraid that they would collect too many and then sell them. I asked Khon, an *ex-kamnan* at the time, for the truth. He revealed that most villagers had done so for five years, triggered by an incident in which a villager had guided an outside collector to extract large amounts of mushrooms and bamboo shoots from others' forests for the purpose of selling them. However, he added, it was presumed that N villagers could collect them in others' forests with permission from the owners. Thip, a villager present at the time, stressed that permission had to be given on request. In reality, however, there were cases in which the owner refused to give permission. This was completely contradictory to what Khon said in 2010.

Assuming that the incident that caused changes in the villagers' behavior occurred around 2010, the custom might have changed between 2010 and 2013 and those villagers who refused others permission to collect mushrooms and bamboo shoots in their own forests gradually became the majority. There has never been any institutionalized mechanism for the modification or reinterpretation of customs in the village. The customs at each moment simply reflect the collective thoughts and actions of the villagers. The villagers, on the one hand, accepted ecological changes in exchange for the wealth they could acquire through rubber cultivation. At the same time, they came to consider the need to enclose their own forest resources, which had become increasingly scarce due to rubber cultivation. The collective attitudes of the villagers resulted in changes in their customs.

As shown above, the responses of local communities to the ecological changes caused by rubber were complex. Two *kamnan* tried to conserve private forests by requiring applications for clearing forests, but their attempt failed. Some villagers believed that herbicide use should be prohibited, but this was not realized. Village customs changed to admit the enclosure of non-timber forest products in private forests. Village customs can be formed and modified by informal consensus as well as through formal village meetings. Informal consensus is shaped as a collective response on the part of villagers to an action inconsistent with existing customs. Individual interpretations are shared in daily chats among villagers. When consensus is reached in this way, customs may change. Based on various events related to rubber—good and bad—individual opinions were established that could change village customs, as above. All these elements were features of a rubber boom assemblage in the village.

VIII Conclusion

As shown above, each actor's behavior supported the rubber boom. During the rubber boom that began in the early 2000s, farmers' spontaneous efforts, rather than government policies, played a key role. Farmers learned that rubber prices were high and profitable, and that rubber could grow as well in the Northeast as in the South. They saw neighbors who had planted rubber becoming rich. People from the South bought land for rubber gardens. Many civil servants also invested in rubber. With all these experiences, farmers were driven to rubber like a pandemic, which finally resulted in the rubber boom spreading through much of society.

This rapid expansion of rubber cultivation had ecological impacts. The mass media reported illegal cultivation within protected areas. Outside protected areas, such as the study site, patches of secondary forests that farmers had customarily occupied were also cleared. Increased floods were suspected to have been caused by deforestation. Contamination by herbicides threatened villagers. Beyond these events, indirect ecological changes related to the villagers' environment and livelihood were also observed, such as decreased daily food resource extraction from the natural environment because rubber cultivators had to tap at night, reduced cattle raising due to difficulty in securing space for herding, and the disappearance of some wild tree-leaf vegetables around paddy fields due to the introduction of large tractors.

However, no actor was on principle negative toward rubber cultivation. Regarding the bureaucracy, agricultural agencies insisted they were not responsible for deforestation because qualified promotion projects involved land with title. However, rubber gardens without land titles were also given technical assistance and qualified to receive replanting funds when trees became old. Under pressure from politicians, officers gave funds for land without legal title, land that was unqualified for the projects due to regulations. Regarding herbicides, officers of agricultural agencies maintained a neutral position. Conservation agencies overlooked local people's clearing of secondary forests outside protected areas. Some officers were involved in corruption as well. Even executive officers doubted whether strictly enforcing regulations might go against the government's policies. So they took measures such as evicting illegal rubber cultivators in the protected forests only occasionally, with well-prepared operations. Local administrations attempted to disseminate the importance of forest conservation. A former NGO worker carried out the family forest project but did not discourage rubber cultivation.

N villagers did not reach any consensus on regulating private forest clearing or herbicide use by amending their customary rules, although many experienced anxiety over these issues. Instead, in response to resource scarcity, the villagers increasingly

enclosed their private forest resources, resulting in changes in customary rules. However, the village's community forest, established with the villagers' consensus, was firmly conserved. A considerable portion of the community forest is rocky and uncultivable. However, the cultivable area has never been invaded, in contrast to private forests, where most of the land has been converted to rubber gardens. It is equally illegal to cultivate rubber in community forests and private forests. The community forest was saved for no other reason than the villagers' strong consensus on this point. Here one can see something of the villagers' sense of balance.

These were all factors of the rubber boom assemblage. Some factors extended over broad geographical areas, such as rubber prices, laws and institutions, the material and biological characteristics of rubber, and the cultivability of rubber in each locale. In addition, there were a number of micro-level elements, such as the various events that the farmers experienced. All these factors had an effect on each other and, assembled, constituted the social climate of the rubber boom. During the rubber boom, the importance of sustainable natural resource management was not completely neglected. Instead, it was internalized in each actor. Actors in whom multiple agencies existed in contradiction to each other and who suffered from a sense of internal contradiction declined to take any action against rubber cultivation. This differs from what Anna Tsing (2005) has described as friction between networks of conflicting values with regard to forest resources. The friction was internalized because the rubber boom took place in the context of an overwhelming desire for socioeconomic improvement in rural areas.

In fact, many actors recognized the problems of ecological degradation but felt that these problems were unavoidable and regrettable. Such an emotional atmosphere in society is thought to have reflected the political environment during Thaksin's government, as well as that of his successors following his ouster by the military coup in 2006. The leaders owed their political power to the strength of their election based on overwhelming support in the North and Northeast of the country. Conversely, reckless measures against illegal forest encroachment were taken by the military government after the coup in 2014. Many rubber cultivators who had long encroached on national forestlands were violently evicted, prosecuted, and jailed. There was no evidence that Thaksin prioritized the expansion of rubber cultivation over nature conservation. However, the political environment during the pro-Thaksin governments was also an important element of the rubber boom assemblage.

Within the rubber boom assemblage, elements such as rubber price, improving farmers' living standards, and democratic political environments formed a sub-assemblage of forces driving the rubber boom. These were so powerful that their friction with sustainable natural resource management and other environmental issues became

internalized. Therefore, it appears that no action was taken against rubber cultivation by any of the actors, and that there was a sudden swing in support of the rubber boom.

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