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Kyoto Working Papers on Area Studies No.40
(G-COE Series 38)

March 2009

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The publication of this working paper is supported by the JSPS Global COE Program (E-04): In Search of Sustainable Humanosphere in Asia and Africa.

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Fumikazu Ubukata^{**}

1. Introduction

There have been many arguments that bring up the issue of forest depletion in tropical developing countries and emphasize the strong need for reforestation. The recent arguments on climate change enforce this view, which have contributed to the decision to include land and forest issues into the Clean Development Mechanism (CDM) (Bäckstrand and Lövbrand 2006), and most recently, to introduce the scheme of Reducing Emissions from Deforestation and Degradation in Developing Countries (REDD) in the international negotiation rounds.

On the other hand, there are many claims that the large-scale monoculture of tree plantation is accompanied by negative social and environmental impacts, such as ecological disturbances and infringement of human rights. Industrial tree plantations for pulp and paper in the tropics, particularly fast-growing tree plantations such as *Eucalyptus spp.* and *Acacia mangium*, are most controversial in this regard (Marchak 1995, Carrere and Lohmann 1996, Lang 2002).

Historically, mainstream tropical forestry has been based on concession systems, whereby the state grants logging companies the rights to extract timber from state-owned natural forest resources, or large-scale plantations, through which the state or private firms directly manage the production process. This kind of “scientific forestry” has largely neglected and infringed upon the villagers’ customary rights to land and traditional methods of forest management. As a result, conflicts regarding land and forests have emerged between the state and the villagers. Previous studies that adopt the political ecology approach, which “combines the concerns of ecology and a broadly defined political economy” (Blaikie and Brookfield 1987: 17), consider forests as arenas where various actors such as the state agencies, firms, and villagers compete for access to resources. They suggest that the power relationships and interactions among these actors greatly affect the fate of the forests themselves (e.g. Hirsch 1990, Peluso 1992, Lohmann 1993).

^{*} The original version of this paper was read at the Core University Program Seminar, Private Faces of Power and Institutions in Southeast Asia, held on the December 6-7, 2007, Bangkok.

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These studies have highlighted the politics in understanding environmental change, as well as the actor-based analysis of environmental policy-framing process. This focus and methodology is welcomed, as we can more deeply understand the complex relationship between environment and society in developing countries. Despite the diverse actors concerned, they sometimes develop a dualistic view of state-private control versus civic resistance, or commercial “scientific forestry” by the state and firms versus villagers’ traditional forest management for subsistence. In order to change this structure, they often claim that “radical change is required” (Bryant and Bailey 1997: 4).

Such a dualistic view, though valid in many cases, does not capture some of the important phenomena that are occurring in the real world: moderate but incremental change. One such phenomenon in forestry sector is the emergence of industrial farm forestry. For instance, some villagers in India and Thailand have grown trees by themselves on their small farms for commercial and industrial purposes (Saxena 1994, Saxena and Ballabh 1995, Ubukata 2001). In Thailand, in particular, farm forestry has expanded in parallel with the development of the pulp industry to the extent that the latter relies on these farms for most of their supplies. This is in sharp contrast with the situation in Brazil, South Africa, and Indonesia, where the pulp industries manage their own plantations to ensure a stable supply of raw material.

Why has the Thai pulp industry developed this farm-based system of supplying raw material? Further, how have the social and environmental problems surrounding industrial tree planting changed in accordance with this structural shift in the industry? To date, few studies have tried to answer these questions comprehensively. This paper examines how the pulp industry in Thailand has developed the farm-based production system of supplying raw material, namely eucalyptus tree, and how its strategic shift from plantation-based to farm-based system caused the dilemma of choice between the two production systems. After explaining theoretical and methodological focus in the next section, the relevant actors during 1980s and 1990s—state agencies, firms, and villagers—are discussed according to their strategies and responses to their socioeconomic situations.

2. Focusing on Production Relations

Judging from above arguments, it is appropriate to say that previous studies underestimated the perspective of production relations in the agriculture, forestry, and the pulp industry. This section provides more detailed examinations of relevant existing studies in Thailand (and elsewhere), and emphasizes the importance of focusing on

production relations. Two theories are relevant in this regard: political ecology and ecological modernization.

Production relations are “the relations of people to products and factors of production in terms of their rights of ownership and use and the corresponding relationships of people among each other as buyers and sellers, as factor owners and renters, as landlords, tenants, workers, employers, creditors, and debtors” (Binswanger and McIntire 1987: 73). Particularly, I focus on the relations with regard to land, notably plantation and peasant mode of raw material production for the industry.

In the context of agricultural economics, there have been many arguments since the early twentieth century regarding the comparison between large-scale entrepreneurial plantations and small-scale peasant farms in terms of economic efficiency (Wickzler 1958). In plantation management, while the firm may benefit from economies of scale or vertical integration of processing and material production, it may be confronted with problems regarding incentives for their labor or high transaction costs for land acquisition (Binswanger and Rosenzweig 1986, Hayami 1996). In peasant farms, on the other hand, the problem of incentives may disappear, but its small size and fragmentation may result in greater transportation costs or constrain the total supply of raw material (Yamashita *et al.* 1999).

While the plantation estates of the colonial period have had an important role in shaping regional trends in tropical agricultural production, equally important is the impact of commercial farms of peasants, especially in some parts of Southeast Asia with high population density, such as the “continental part” of the area and Java island (Hayami 1994, 1996, 2000). Considering such structure of agricultural development in the continental part of Southeast Asia, particularly strong peasant-dominant agrarian structure in Thailand, it might be natural to assume a historical path for the Thai pulp industry to move toward the peasant-based production system of its raw material. Most studies focusing on industrial tree plantations in Thailand, however, were based on radical political ecology approach which was mentioned in the introduction¹. They have primarily dealt with the dichotomous logic of state-private control of land and forest versus anti-plantation movements, and did not consider, or even exclude, the possibility of such a structural shift in the industry (e.g. Puntasen *et al.* 1992, Tasaka 1992).

More recent studies, such as Carrere and Lohmann (1996), Lohmann (1996), and Hall (2003) partially refer to this shift. Without intensive analysis, however, they regard it as

¹ The notable exception is main stream economic approach by Tongpan *et al.* (1990). As in the political ecology approach, this study did not consider the possibility of shift of the industry.

the industry's second choice strategy after the anti-plantation movements, and treated as a somewhat "exceptional case" in considering political ecology of industrial tree plantations. Some recent NGO reports, such as Kuaycharoen (2004), also refer to this policy change and critically describe it as a mere "revival of the state policy" (*ibid.* p12) to pave the way for large-scale tree plantations.

Though these claims are not completely wrong, this is only the half of the story. They fail to address how and why the state, the industry, and some farmers responded to the rapidly changing politico-economic situations. Though it is right to criticize the state/industrial justification or unnecessary support of industrial plantation as a means to "reforest" the country, they tend to overlook agricultural aspects of tree growing. Moreover, in neglecting above-mentioned historical courses of agrarian development and treating the Thai case as an exception, they also fail to address why this shift has not occurred in Indonesia and many other tropical countries. A close analysis of such an "exceptional case" may provide some implications about the possibilities and limitations of ecological modernization concept in developing countries, and hence toward more sustainable and equitable governance structure of the industry, and its path dependency.

Ecological modernization is a concept that seeks social processes to restructure "the capitalist political economy along more environmentally sound line" (Dryzek 2005: 167). Though reform-minded, it clearly distinguishes itself from neo-Marxist and postmodernist theories by trying to move "beyond apocalyptic orientations to see environmental problems as challenges for social, technical and economic reform, rather than as immutable consequences of industrialization" (Mol and Sonnenfeld 2000: 5). In this sense, we may say that this approach seeks "win-win" solutions among capitalism, industrialization, and environmental problems, which totally contrasts to the stance of (radical) political ecology approach.²

Though this approach may consider more a moderate, incremental type of reform, it also has serious limitations. Due to its Eurocentric theoretical orientations, relatively few studies have been conducted along this concept in developing countries where the environment increasingly casts important questions. Moreover, the majority of those studies that are conducted in developing countries mainly focus on limited issues, such as pollution abatement of the industries (e.g. Sonnenfeld 2000, 2002). It is clear that they overlook the effect of problematic upstream industries such as plantation sector and that of raw material supply, in which production relations to land becomes an important issue,

² There are, of course, considerable variations within this concept. Bäckstrand and Lövbrand (2006), for instance, distinguish "strong" and "weak" versions of ecological modernization in their discussions on the political process of climate change issue.

as well as ecological aspects and social justice.

The above arguments imply an interesting crossover between the two contrasting approaches, through the mediations of production relations perspective. This may cast the following questions: to what extent can “win-win” solutions be created under the socio-politic situations in developing countries? In what sense are industry, society, and environment in the third world contradictory? Focusing on production relations in this way not only opens up a basis of comparative analysis on the status of “industrial governance” and its dynamics, but stimulates further discussions between the two contrasting approaches.

In the following analysis, I will employ an actor-oriented analysis with considering production relations and the characteristics of eucalyptus planting. As many political ecologists believe, this paper also argues that this analysis has a great potential to understand political-ecological conflicts and cooperation “as an outcome of interaction of different actors pursuing often quite distinctive aims and interests” (Long and Long 1992, quoted by Bryant and Bailey 1997: 24). In addition, I try to blend institutional analysis of the production relations with discursive interpretation on ecological perception.

In the following sections, the distinctive attributes of eucalyptus trees that affect aspects of its management and marketing systems are first drawn out and then compared with other agricultural commodities in Thailand. Second, sociopolitical problems faced by the plantation-based system of eucalyptus production, the ways the state and firms have modified their policies and strategies accordingly are reviewed, as well as how they obtained an official ecological legitimacy of eucalyptus production. Third, the villagers’ responses as well as the transformation of farm-based eucalyptus production and its market following the 1997 economic crisis and thereafter are analyzed. In conclusion, both the ability and inability of farm-based production system to cope with political, economic, and ecological problems are mentioned, and some prospects for international comparison are elaborated as well as some future directions.

3. Characteristics of Eucalyptus Production and Its Market

Eucalyptus is a genus of tree that is originally found in Australia and neighboring islands. It is fast-growing, regenerates by coppice, and is a source of raw material for various industrial products such as pulp and paper, timber, fiberboard, plywood, fuelwood, oil, and so on. The first recorded introduction to Thailand was in 1941 (Pousajja 1996). After long years of growth tests, the Royal Forest Department (RFD) decided to promote *Eucalyptus camaldulensis* because of its ability to adapt to diverse environments in

Thailand. Therefore the word ‘eucalyptus’ (*yukaliptat*) in Thai generally points to this species³.

During the 1980s and 1990s, the planted area of eucalyptus in Thailand had rapidly expanded, particularly in the east and northeast regions. The production has been utilized primarily as raw material for pulp, while a part of it is utilized in the urban construction pole market. The total planted area in the country had increased remarkably from 62 thousand ha in 1985 to 350 thousand ha in 1995. Planting by the private sector had been especially vigorous increasing from 14 thousand ha in 1985 to 430 thousand ha in 1997⁴. Given the policy restrictions which will be discussed later in the paper, the expansion of small-scale farm forestry is likely to account for a significant proportion of this increase. Some reports planted area by small farmers account over 64 percent of total eucalyptus area (Barney 2005).

Actually, such drastic crop diffusion is not new in Thailand. The cultivation of rice in the central delta, that of maize in the central hills, kenaf and cassava in the east and northeast, and para-rubber in the south are typical examples of crops that have undergone such drastic diffusion. The expansion of these export crops had largely attained through “Vent-for-Surplus” situation of international trade: by utilizing “unused land” (i.e. lowland delta and upland forests) and the influx of peasants (e.g. Ingram 1971, Feeny 1982, Fugile 1989, Hayami 2000). This had continued until the early 1980s, when the land frontier had almost vanished in Thailand.

Basically, these “traditional” crops are traded on an arm’s-length basis (Siamwalla *et al.* 1993). The products are traded from farmers through middlemen, processors, and exporters before they finally reach the consumers. Under this structure, market information quickly spreads to the farmers, and intermediaries or processors cannot exercise monopoly power over them. It is said that such a competitive market structure has brought about high adaptability and efficient movement of agricultural production (Shigetomi 1987). The attributes of eucalyptus production for pulp industry, however, are different from those of “traditional” commodities, and this has caused the characteristics of its management and markets to differ. Five points, both economic and ecological point of view, are briefly mentioned here.

³ Due to this reason, the author applies the word “eucalyptus” as the specific indication of *Eucalyptus camaldulensis* throughout this paper.

⁴ See Uraphiphathanaphong *et al.* (N.d.), RUAB and FRC (1997), and Sunthornhao (1999), for the total area and the area planted by private sector in 1985, the total area in 1995, and the area planted by private sector in 1997, respectively. Unlike other agricultural commodities, there is no official statistics on eucalyptus plantation area which includes villagers’ spontaneous plantations. According to Barney (2005), the latest estimate is from the Thai Tree Farmers Association, which estimates a total of 466 thousand ha (Nakarin 2001, quoted by Barney 2005: 15).

First, it is characterized as a long-gestation crop because it requires more time (approximately five years) before the product can be harvested. Further, a matured tree does not result in a shortening of the production period as in the case of para-rubber and fruits, though it is possible to delay the harvest of eucalyptus trees with the expectation that the price will rise. From a forestry perspective, however, the five year-rotation period of production is very short period of time.⁵ It is thus important to say that fast-growing trees like eucalyptus have characteristics that fall between forestry and agricultural crops.

Second, being a tree crop, eucalyptus production has a capital-intensive (and labor-saving) nature (Saxena 1994, Ubukata *et al.* 1998). While it requires a relatively large initial investments for the purchase of seedlings and fertilizer and labor costs for planting, few subsequent investments are required until the harvest. Third, with these attributes, it is said that there are economies of scale in the production. From a cost-benefit analysis of eucalyptus plantation in eastern Thailand, Tonpan *et al.* (1990) reported significant increasing return to scale⁶. Forth, eucalyptus is primarily utilized as a raw material for the pulp industry, which is famous for its capital-intensive nature (Carrere and Lohmann 1996). Thus, the pulp production itself has strong economies of scale.

Fifth, it is said that there are some ecological risks in the production of eucalyptus trees (Shiva and Bandyopadhyay 1987). Its high water and nutrient consumptions may affect crops nearby (Saxena 1991), and in more harmful cases, this may lead to soil degradation and a drop in groundwater levels (FAO 1988). These aspects add an important question of socio-ecological costs of eucalyptus planting, particularly in large-scale plantations, though growers and firms largely neglect these negative externalities.

Apart from ecological aspects, these attributes theoretically result in a preference for integrated, large-scale raw material supply systems. In other words, firms would manage their own large-scale plantations to ensure a stable supply of raw material. If this is true, why has the Thai pulp industry failed to apply this strategy?

⁵ The rotation period of Teak, an important timber species in the Tropics, are generally assumed as 50-100 years.

⁶ This work is not based on field data but cost and benefit simulations. Compared with agricultural crops, few studies analyzed the scale economies of tree plantation, which still leave this question as an empirical one. From theoretical point of view, Binswanger and Rosenzweig (1986) acknowledged scale economies of tree productions, as they are long-gestation crops and need capital investment. Hayami (1996), however, opposed this view because peasants often plant trees in land with few opportunity costs, such as paddy band and waste land.

4. Tree Plantation by the Private Sector and Anti-Plantation Movements

To answer the above question, it is necessary to review the recent development in the Thai pulp industry along with the forest policy that underpinned it. Forests in Thailand have depleted rapidly over the past four decades due to the commercial logging and expansion of commercial agriculture. The forest frontier in Thailand has already disappeared.

Since the establishment of the Royal Forest Department (RFD) in 1896, forests have belonged to state and have been managed exclusively by the legal system. In the 1960s, the RFD started to designate national parks and national forest reserves (NFRs) to conserve forest resources, while it provided logging concessions all over the country. At that time, the rapid diffusion of commercial crops such as maize and cassava was in progress. Many farmers entered the forests and opened it up to cultivate these crops. In order to tackle with the communist insurgency, the state and military sometimes did promote such migration. Thus, tensions arose between the RFD and villagers for the access to forest land.

Under the forest laws of the state,⁷ villagers who reside and cultivate in these designated areas became illegal squatters. As a result, millions of villagers came to live in the NFRs or national parks, and they were viewed as ‘forest encroachers’. Many NFRs were transformed into complete agricultural fields and remained NFRs in name only.⁸ By the 1980s, the forest frontier had largely vanished.

The policy makers of the RFD felt that it was impossible to maintain and rehabilitate its forest resources within its budget. In 1985, it therefore drew up the National Forest Policy, the first comprehensive forest policy in the country. Its aim was to recover 40 percent of the total land area as forests, consisting of economic (25 percent) and conservation forests (15 percent). In order to reforest the country, it encouraged the private sector to participate and establish ‘economic forests’. ‘Degraded’ NFRs were leased to private companies at the reasonable rate of 10 baht (0.4USD at the time, initially only one baht) per one rai (0.16 ha) (Tonpan *et al.* 1990).

At that time, the Thai economy had started to grow rapidly, and the pulp and paper industry was no exception. During the early 1980s, there were only three pulp mills

⁷ Related laws include the Forest Act of 1941, the Wildlife Protection and Reservation Act of 1960, the National Park Act of 1961, and the National Forest Reserve Act of 1964.

⁸ There are many fine reviews on how these situations of NFRs had created. For example, Hirsch (1990) briefly accounts the history and situation of NFRs, while Pragtong and Thomas (1990) focus on the state policy.

across the country: Phoenix Pulp & Paper, Siam Pulp & Paper, and Bang Pa-in Paper.⁹ They used non-wood sources of raw material such as kenaf, bagasse, and rice straw. Due to the constraints of raw material supply, however, they were forced to switch from non-wood to wood sources. For example, Phoenix initially produced pulp from kenaf, but as kenaf farms were rapidly replaced by cassava farms in the northeast, it was forced to change its raw material to bamboo and eucalyptus (Sonnenfeld 1998).

During the economic boom, many firms started operations or expanded their production capacities, including Siam Cellulose in 1992, Phoenix's second mill in 1994, and Panjapol Pulp and Advance Agro during 1995-1996. The state, notably the Board of Investment (BOI), also actively supported this industry through reductions in corporate tax and waivers on import duty for machinery (Barney 2005).

In most newly-established mills, eucalyptus was used as raw material. In 2000, the industry's production capacity of short-fibered pulp reached 956 thousand tons, an increase from 177 thousand tons in 1991 (TPPIA 2001). The production also has shown constant increase since 1980s (Figure 1).¹⁰ The main countries for import are the countries producing long-fibered pulp and sources of waste paper such as Canada, USA, and Sweden. The main destinations for export are big consumers in Asia: China, Taiwan, and South Korea. Particularly, resource-hungry China has been of crucial importance.

For these firms, eucalyptus was a very attractive raw material that can be used to produce a globally recognized pulp. The problem was, however, how to provide a supply of this fast-growing tree. At first, they tried to establish their own plantations, taking advantage of the 'reforestation' policy stated above. Many firms, therefore, rushed into the 'reforestation' businesses by acquiring as much 'degraded' NFRs as possible. They did so by using their political connections, both legally and illegally. For example, the Sung Hua Seng group (which later established Advance Agro) utilized its close links to the Democrat Party. Another example is that of the steel giant Sahaviriya, which held a woodchip company and was a strong supporter of the Chart Thai Party (Puntasen *et al.* 1992, Tasaka 1992). At last, the conflicts among the actors brought the issue into the political arena. In 1990, Sung Hua Seng's Suwankitti company was accused of illegal encroachment of NFRs, and political scandals were uncovered (*ibid.*).

⁹ Siam Kraft was taken over by the Siam Cement Group in 1982 and renamed as Siam Pulp & Paper. Another mill, Kanchanaburi Paper, halted pulp production in 1983 (Suannamena 1996).

¹⁰ The fluctuations of import data after 2003 in Figure 1 are likely to be errors in the definition of the item in the Forestry Statistics. Neither the import data (monetary value) by the Custom Department nor the world pulp prices (Northern bleached softwood kraft pulp: NBSK) during the period imply such fluctuations (Office of Industrial Economics homepage, Cody 2005).

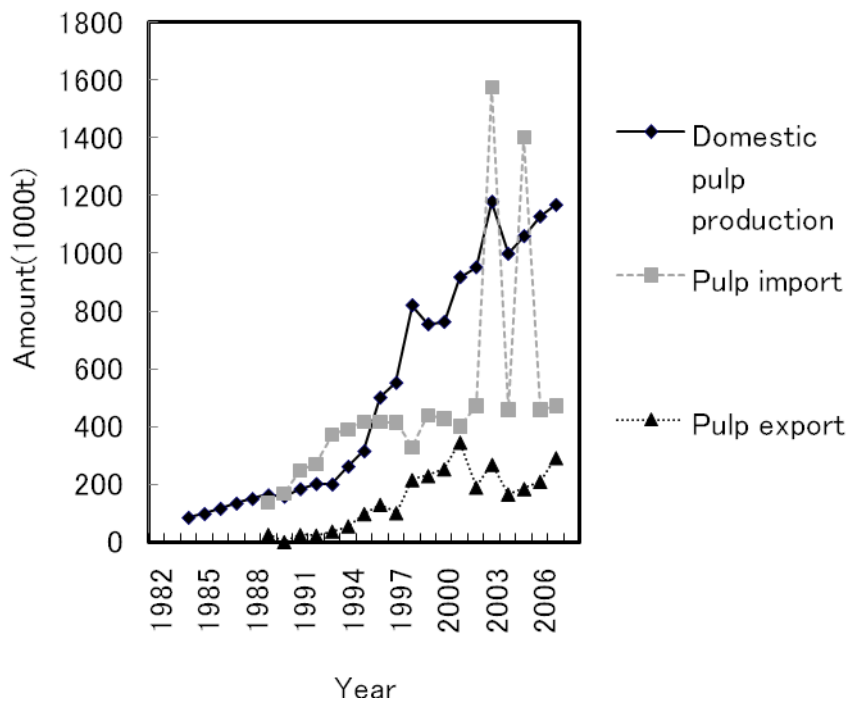


Figure 1: The trend of the Thai pulp industry

Source: Forestry Statistics of Thailand (obtained through website)

The biggest losers in this battle, however, were the millions of villagers living in the NFRs. When the ‘reforestation’ plan was implemented, they were immediately treated as illegal forest encroachers. Their land for cultivation or communal land were seized for the eucalyptus planting, and in the worst cases, they were scheduled for eviction. The government also supported this process both implicitly and explicitly. For example, the military-led *Khor Jor Kor* program, or Land Allotment Program for the Poor Living in Degraded Forest Reserves, forcibly called for the resettlement of many “forest encroachers” (Lohmann 1993).¹¹ Moreover, as in the Royal Dutch Shell’s project during late 1980s, the some rich forests were planned to be converted to large-scale forest plantations (Lohmann 1990, Tasaka 1992).

These hard-line approaches sparked off strong resistance among the villagers.¹²

¹¹ The project ostensibly aimed at solving deforestation problem by re-allocating degraded forests for poor villagers and reforestation purposes. Some argues, however, that two-thirds of the land was allotted to the latter, while only one-third for the former (Kuaycharoen 2004). Pye (2005:110-113) regards this project as an attempt by the old elites (say, military and forestry officials) to increase control and influence over the NFR areas and the emerging industries.

¹² The chronology of these movements is well drawn in Lang (2002) and Pye (2005). The author do not describe in detail about these movements, as there are a lot of fine reports focused on them.

According to Tasaka (1992), the first protest occurred in Uthunpong Pisai district, Sisaket province. Demanding to stop eucalyptus planting, two thousand villagers entered into the plantation area, damaged the planted trees and nursery, and burned out the RFD plantation office. It was followed by villagers in Pakam district, Buriram province. They made a demonstration and demanded to return confiscated land for a plantation project.

In addition to land issues, ecological aspects of eucalyptus planting were also taken as controversies. Villagers in protest claimed that eucalyptus tree has a negative impact on the growth of agricultural crops nearby.¹³ They also claimed that they can not utilize forests as they did because their indigenous forests were replaced with eucalyptus plantations (*ibid*: 170-177).

These protests grew rapidly during 1987-1988. Among them, the resistance in Dong Yai forest reserve, Pakam district, Buriram province and the campaign against Royal Dutch Shell's project in Chantaburi province are the symbolic cases that were repeatedly reported by mass media. The former became a frontline of the movement during the 1990s after the monk Phra Prajak led the protests. The latter was noticed in the international arena because of the involvement by the oil major. Facing severe criticism, the Shell was forced to retreat from the project.

Further, after serious floods occurred in the southern provinces in 1988, the RFD and provincial logging companies were criticized for mismanaging the country's forest resources. As a result, in 1989 the parliament passed a nation-wide logging ban and halted all the forest concessions, which led the RFD to shift its focus to reforestation.

The subsequent trial of the RFD to "reforest" the country had often been the target of severe oppositions. After an interruption for a period of years, the introduction of military-led *Khor Jor Kor* program in 1991 revitalized the protest. For example, a union of NGOs made a statement against the program in late 1991, soon after it caused the conflict between the military and villagers (Matichon January 1, 1992). On March 11, 1992, the leaders of the student union of Thailand (So No No Tho) with one hundred eighty northeastern villagers negotiated with lieutenant general Wimol Wiwatpanit (Lok Sikhiaw 1993: 12). These NGOs and student unions made significant contribution on networking the dispersed protests into a movement, and organizing the mass protests when needed (Phongpaichit and Baker 1997). Mass media also contributed to create

¹³ As stated below, yet there are many arguments on whether or not the eucalyptus negatively affects the soil and the nearby crops. The RFD insists that such effects are minimal and do not differ from other tree species. Contrary, the king did not consider eucalyptus plantation as environmentally favorable (Puntasen *et al.* 1992).

critical public opinions by repeatedly covering this issue.¹⁴

During the mid 1992, the movement reached its peak. In April, the military chief commander General Suchinda Prakrayun became the prime minister, which triggered strong protests to demand his resignation. After the Bloody May incident, General Suchinda stepped down from the premier and a transitional government led by Anand Panyarachun was installed.

In the end of June, around three thousand northeastern villagers gathered in front of the provincial court of Nakhon Ratchasima, and made a demonstration to demand cancellation of *Khor Jor Kor* program and restoration of the status quo ante. The demonstration became a march to Bangkok and it occasionally shut down the Mittraphab highway connecting the Northeast and Bangkok. The cabinet immediately promised to cope with the problem, and in July, the cabinet decided to cancel the program and to restore the status quo ante for the evicted villagers (Lok Sikhiaw 1992a: 57-61).

The anti-eucalyptus movements initially started with local resistances by northeastern villagers, and later grew into a nationwide movement that involved various social sectors including NGOs, mass media, and academics. The resistances against *Khor Jor Kor* program, for example, were especially strong, and coincided with democratic movements during the military-led government in 1992. As suggested by these incidents, the democratic movements no doubt benefited the anti-eucalyptus movements by presenting a political opportunity to negotiate with the government. It was also important that the issue itself was deeply related to the livelihood of the poor, which had gained considerable sympathy across the social groups.¹⁵ Facing these threats, the government could no longer neglect the movements.¹⁶

5. Policy and Strategic Shift toward a farm-based Supply System

These political scandals and social movements forced the government and firms to reconsider their strategy for supplying raw material and the underpinning forest policy. Since the early 1990s, both the government and the firms had responded to the situation through changes in policy and strategy. Roughly stated, two issues could be addressed in

¹⁴ It was reported that newspaper coverage on forest problems had drastically increased during the past decade (Krungthep Thurakit, December 4, 1991).

¹⁵ This type of environmental movements is called “environmentalism of the poor” (Martinez-Alier 2002). Forsyth (2007) points out that media coverage of this type of environmental movements (which he calls “red green”) has been increasing since 1990s.

¹⁶ See Pye (2005) on why the anti-*Khor Jor Kor* movement was successful and how these movements altered the politics of forests thereafter.

the related policy formulation process.

First is the reclassification of existing NFRs. The cabinet resolution of May 15, 1990 prohibited the leasing of NFRs for tree planting by private firms. Pros and cons of eucalyptus planting were examined by the committee under the National Forest Policy (Hatakeyama 1993). RFD was obliged to conduct zoning of NFRs to clarify suitable area for tree planting (Lok Sikhiaw 1992b). In the Seventh National Economic and Social Development Plan (1992-1996), the reforestation target of the 1985 National Forest Policy was revised to 25 percent in conservation forests and 15 percent in economic forests (Makarabhirom 1998). Finally, the cabinet resolutions of March 10 and 17, 1992 redirected the zoning policy of NFRs. They were divided into three categories: Zone C (conservation zone, 14.1 million ha), Zone E (economic zone, 8.3 million ha), and Zone A (zone suitable for agricultural production, 1.2 million ha) (RFD 1996a).

Second issue is about the regulations on tree plantings, particularly in the NFRs. Before 1990 under the Chatchai Chunhavan's cabinet, there was a discussion to legislate "the Tree Plantation Act", in order to facilitate fast-growing tree plantation by the private sector. Several political parties submitted their own version of this act. After the suspension of the lease of NFRs in 1990, however, the critical arguments became dominated, which made them difficult to include original objective for this act. Under the regulation of the ban of large scale leasing, The Tree Plantation Act of 1992 was enacted in a much revised content so that eligible tree species could be limited to indigenous "restricted" species (Saesi 1994: 27-29)¹⁷.

Further, on September 8, 1992, just a few months after the political turmoil of the Bloody May incident and anti-*Khor Jor Kor* movements, Anan Panyarachun's second government issued a cabinet resolution. It specified five conditions for tree planting in NFRs by the private sector, which included the restriction of the total area covered by planting plots per household to less than 8 ha (Hatakeyama 1993: 49-50).

Consequently, the cabinet resolution on Sep. 8, 1992 was very important in directing their strategies thereafter. The evidence shows that the cabinet did not easily arrive at this decision, for there were pressures both from inside and outside the government to influence it. For instance, RFD sent a letter to the agricultural minister Kosit Panpiamrat to urge to cancel the cabinet resolution on May 15, 1990, which would have prohibited

¹⁷ Restricted tree species (*mai huang ham* in Thai) is the category of species that accords special regulation in the Forest Act of 1941. It includes teak, yang na (*Dipterocarpus alatus*) and other indigenous species. Fast-growing exotic species are not included in this category of species. Some villagers both inside and outside the NFRs, however, planted eucalyptus in their land regardless of this regulation (note that tree planting is a good mean for them to claim their access to land).

the leasing of NFRs for tree planting, because it completed the zoning of NFRs. But Kosit did not agree with the idea and suggested to support smallholders to plant trees. After his comment, the association of pulp industry counter-argued that tree planting by smallholders would have a quality problem, and prohibition of the corporate tree planting would close the way to develop the industry. Kosit refused to compromise, arguing instead that “these companies can participate in smallholders’ tree planting activities through contract farming” (Lok Sikhiaw 1992b: 60-61).

I can point out two factors that inhibited the cabinet from supporting the pressure by the industry and RFD: The first is that the cabinet had to maintain a good public image in light of recent events, including the Bloody May incident and anti-*Khor Jor Kor* movements. The second is that this cabinet was composed of experienced technocrats and was relatively free from political and industrial circles (Tamada 2008). For instance, Kosit Panpiamrat had once engaged in rural development in the National Economic and Social Development Board (NESDB) and had been familiar with rural issues. Moreover, in contrast to Anand’s first government during 1991, his second government was free from military influences.¹⁸

The above arguments imply that the shift toward contract tree farming preceded the similar arguments that occurred in September 1993, when the government under the Chuan Leekpai included eucalyptus in the list of eligible tree species for promotion. In the latter argument, according to Kuaycharoen (2004: 12-13), there was a political link between the pulp and paper industry and policy makers and politicians, including Suthep Thueksuban, then Deputy Minister of Agriculture. They urged to lift the cabinet resolution of September 8, 1992 in order to pave the way for the tree plantation by the private sector. Thanks to the opposition by the other ministers, this did not come into reality, and the way that both the villagers and the private sector could benefit was sought. As a result, the alternative measure was taken: The cabinet agreed to include eucalyptus as an eligible tree species for promotion, while it still maintained a political stance of September 8, 1992 cabinet resolution.

Thus Zone A and a part of Zone E in the NFRs were transferred to the Agricultural Land Reform Office (ALRO) and were scheduled to issue land documents assuring usufruct rights (Sor Por Kor 4-01) to the villagers (RFD 1996a). In the area under ARLO’s supervision, reforestation was promoted according to the rule that would leave 20 percent of the area as a “forest.” Consequently, the government came to promote small-scale tree planting by villagers, while it trod warily on large-scale tree planting by private firms.

¹⁸ A lot of legislations, from economic liberalization to environment, were enacted during the Anand’s governments and highly praised by the academics in this regard (Tamada 2008, Lok Sikhiaw 1995).

This policy change was practically implemented through the 1992 establishment of the Reforestation Promotion Office in the RFD. Various tree plantation promotion projects had launched for villagers¹⁹.

This was followed by the response of the firms. In short, they too came to shift their strategies for supplying raw material during the late 1980s to early 1990s, while they still put pressure to the state to revise the official permission for tree plantation. They switched from a plantation-based strategy of establishing their own large-scale plantations to a farm-based strategy under which villagers were either encouraged to plant raw material or wherein it was simply bought from them. Some also developed contract tree farming (CTF) to ensure a stable supply. For example, Phoenix Pulp & Paper followed this shift due to the failure of plantation establishments (Makarabhirom 1998). Advance Agro developed the CTF system as it expanded production capacity, even though it already had acquired large plantations areas during the 1980s.

According to Hall (2003), industrial tree plantations are more likely the target for NGOs as anti-movements than industrial shrimp farming because they involve fewer villagers in the production process. In this sense, it can be said that the state and the industry started to move toward the system which is less exposed to such movements because they involve villagers in the production. It was not likely, however, that anti-tree plantation movements solely forced their policy and strategy to change. A number of casual factors accompanied with them actually increased political opportunity structure toward change. For instance, the coincidence of anti-tree plantation movements with anti-military movements in 1992 made some reform-minded politicians in the Anand's second transitional cabinet (many of them were from experienced technocrats) more sensitive to civil movements. This created cleavage among the political elites, bureaucrats, and the industry. These 'supply side' analyses, and particularly the analysis of the state, have largely been neglected in the previous studies.

6. De-contextualization at Work: the Ecological Debate on Eucalyptus by the State

Apart from policy and strategic aspects mentioned above, there was another important issue on eucalyptus planting: an ecological aspect. At the time, there had been a wide range of discussion on this issue not only in Thailand but in other countries, such as India

¹⁹ For instance, the "Farmers' Forest Plantation Promotion Project," launched in 1994, granted growers of indigenous trees a subsidy of 3,000 baht per rai (equivalent to USD750 per hectare in 1994) for the first five years. The "Restructuring Agricultural Production System Project" aimed at replacing cassava with fast-growing trees. Cheap credit (5 percent interest rate) was provided from the Bank of Agriculture and Agricultural Cooperatives (BAAC) to the participants, as well as small amount of material inputs (seedlings and fertilizer).

(Raintree 1991). While some are critical about agro-ecological effects of eucalyptus planting, others counter-argued that there were no enough scientific evidences that support such effects, although admitting ecological risks under certain conditions (Davidson 1985).

Studies in Thailand had also showed mixed results. For example, Craig *et al.* (1988) reported significant crop losses near eucalyptus trees in paddy fields of northeast Thailand. However, the RFD insisted that such effects are minimal and do not differ from other tree species.²⁰ It argued that eucalyptus planting is less ecologically harmful than cassava cultivation, a competitive crop to eucalyptus. RFD even pointed out that eucalyptus planting can be ecologically beneficial if it is planted on degraded land, though admitted some ecological risks of eucalyptus planting under specific conditions and need for some care (RFD n.d.).²¹

In hopes to settle such polarized arguments, the Food and Agricultural Organization of the United Nations (FAO), Regional Office for Asia and the Pacific held a consultation with the experts on this issue in 1993 at Bangkok. This was done by scientific basis by the forestry experts. The report of this consultation declares,

(FAO officers) recognized the need to examine these polarized positions in a scientific manner so as to identify those situations where the eucalyptus should, or should not, be used. Since one of the FAO's most important functions is that of providing a neutral forum for countries, institutions and individuals to come together to discuss issues of common concern,...(FAO officers) arranged a Regional Consultation to bring together all those with an interest in the subject (White *et al.* 1995: Foreword, word in parentheses added).

According to the participant list in the report of this consultation, there were 82 participants from 15 countries in Asia and the Pacific and from international organizations; of these, 29 were from the state forestry offices and researchers in universities, 14 from state/private companies, eight from international/bilateral aid organizations (except FAO), 13 from FAO offices and projects, two from mass media, and 16 from NGOs and others (*ibid.* 1995: 159-170). Biophysical and environmental

²⁰ According to the report by the working committee of research on this issue, a study by the RFD research team shows that there was no significant difference in terms of the effects on soil and water conditions in the initial phase (0-4 years) between *Eucalyptus camaldulensis* and another fast-growing tree species (*Acacia auriculiformis*) (RFD n.d.: 12-15).

²¹ These conditions include planting too close to cultivate crops (may lead to crop losses) or water sources (may cause water level down), and dry conditions (those of annual rainfall less than 750mm inhibit infiltration of allelopathic chemical in its dead leaves) (RFD n.d.: 32).

impacts, social and economic impacts of eucalyptus plantations and policy issues were discussed thoroughly for five days.

As a result, the participants acknowledged some of these negative impacts,²² and it was concluded there was a need for: more participatory approach to plantation management, forest policy reforms, consideration of existing land tenure, special care for water competition, soil nutrients and allelopathic effects under dry conditions and soil erosion. Furthermore it was noted that undisturbed natural forests should not be replaced, while eucalyptus plantations have higher biodiversity than many types of degraded lands. Finally, the report concluded with following note as a root cause of the eucalyptus debate.

“There is now recognition by all who attended the consultation that the problems and conflicts formerly blamed on species of the genus *Eucalyptus* arise more from the intensive application of government policies on afforestation and from social justice than from the eucalypts (*ibid.*: 148)”.

This statement might be reasonable from scientific point of view. However, beyond its scientific arguments, this consultation was important in the following two senses. First, it provided a profound base of legitimacy for state agencies, private companies, and aid organizations to promote further eucalyptus plantation. For instance, shortly after this consultation, the internal committee of Japan International Cooperation Agency (JICA) reached a similar conclusion on this issue, and gave green light to continue support for plantation projects (JICA 1993)²³. Similarly, the attitude of RFD on eucalyptus (cf. RFD n.d.) was reinforced by the statement of the FAO consultation, though the statement ostensibly implied more policy reform.

Moreover, it is likely that the introduction of farm-based system have also served to enhance its legitimacy, as it could involve villagers in the production process and mitigate negative social impacts mentioned in the statement. Advance Agro, for instance, emphasizes “farmed trees concept” which benefits “not only the company but at the same time promotes economic sustainability by providing extra income to almost 1.5 million farmer families in Thailand” (Advance Agro’s homepage).

²² These include 1) nutrition and water competition (and allelopathic effects) with crops nearby under dry conditions (less than 1,200 mm annual rainfall, particularly that of less than 400 mm), 2) social and economic injustice against villagers, 3) loss of villagers’ benefits (e.g. non-timber forest products) from degraded forests by the replacement to plantations, 4) loss of biodiversity compared with natural forests. Many of these (particularly 2)-4)) are, according to the report, not specific problems of eucalyptus itself, but of tree plantations in general or socioeconomic conditions which the country faces (White *et al.* 1995, Kashio 1998).

²³ See Kami Parupu Syokurin Mondai Network (1994) about the Japanese NGO’s critics to this response.

Second, the above statement was the product of de-contextualization of eucalyptus tree from broader social, economic, and political contexts. Ecological factors are separated with the other factors, and independently examined. Science by the experts, particularly reductionism, did matter. Interestingly, one of the FAO officers at the time who was actively involved this consultation made a reflection on the matter. He notes that,

“If someone argues to ban the usage of knife because it can kill people, anybody gets angry as this is an absurd remark. Planting eucalyptus also has some elements that offer some socioeconomic demand. We should not exclude rational way of thinking that utilize its advantage and overcome its shortcoming (Kashio 1998: 244, translated by the author)”.

This “metaphor of knife” clearly shows the context of de-contextualization in the name of science. By disconnecting eucalyptus tree itself with social, economic, and political issues, the pros and cons of eucalyptus trees were “(scientifically) rationalized” factor by factor, whereby successfully created a set of policy recipe so that the state and industry could be conferred legitimacy for eucalyptus plantation. On the other hand, actual cautious measures were not made in the promotion, as the problems were “not because of eucalyptus itself, but of socioeconomic structure”. In this way, the state and the industry had created an official ecological discourse of eucalyptus planting. Science had contributed significantly to this creation beyond its suggestions. In this sense, it is neither regarded as “neutral” nor “objective”, but deeply involves in creating certain political discourses.²⁴ Moreover, this was in line with the policy and strategic move toward farm-based system of production. Together with plantation technique, this line of knowledge was included in the RFD’s training programs for villagers²⁵.

One may note that in the “metaphor of knife” argument that the usage of knife (say, when, by whom and where the knife can be used) greatly depends on the situation and context that potential user faces. In fact, Raintree (1991: 30), one of the participants of the consultation, rightly pointed out that what was needed was “a much expanded repertoire of tree growing practices and the recognition that what we are dealing with are always the attributes of a particular *species* in the context of a particular *technology* intended for a particular *user* within a particular *socioeconomic setting* in support of a particular development strategy (emphasis as it is)”. The problem is, however, whether combinations of these elements really create greater repertoire or not.

²⁴ Many studies on science, technology and policy issues point out such political nature of science (e.g. Hajer, 1995, Forsyth, 2003, Forsyth and Walker 2008, Harding 2008).

²⁵ For the promotion, the RFD published a handbook of eucalyptus for farmers (RFD 1996b). Its content includes the characteristics of eucalyptus, its utilizations, planting methods, estimated costs and benefits and so on.

In the real world where many factors are interwoven, reductionism does not necessarily obtain socially optimal set of choice. Moreover, there should be different types of rationalities which various actors follow, as Beck (1992) suggests. The analysis of villagers' point of view can be valuable in this regard. Together with villagers' decision making toward eucalyptus planting and the formation and trend of the market, the author offers some insights from this point in the next two sections.

7. Villagers' Responses and Establishment of Marketing Systems

In the previous two sections, the author analyzed responses of the state and industry to the anti-plantation movements both institutionally and discursively. So far by the policy and strategic shift and official legitimacy, the state and the industry had founded both institutional and moral base of farm-based system of raw material procurement. Then, in order for these policy and strategic shifts to bear fruits, one important question should be raised: how did the villagers respond?

Interestingly, this system was also accepted by *some* villagers. In fact, there were many villagers who spontaneously planted eucalyptus outside the policy and contract farming scheme.²⁶ One key factor is the profitability of eucalyptus planting. Some studies imply that the low cassava price during the early 1990s improved the relative profitability of eucalyptus planting (Ubukata *et al.* 1998), together with some state-aid effects in some areas. However, the villagers' response to this actually varied. The case study of two northeastern villages producing both rice and field crops (namely, G and P villages) by Ubukata (2001) found the varieties of farmers' responses.

In this study, two adjacent villages where went through contrasting responses, one where many villagers spontaneously planted eucalyptus (P village) and the other did not (G village), are analyzed through the case study in Khon Kaen province, northeast Thailand. It was found that these villages had experienced three stages of agricultural development during the 1980s to 1990s; the factor substitution process for land (diffusion of high yielding rice variety (HYV) and application of fertilizer) until the late 1980s, the factor substitution process for labor (mechanization and shift for labor-saving crops) during the early to mid 1990s, and the stage after the 1997 economic crisis. Moreover, the differences in planting behavior of eucalyptus tree arose as differences of response to the second stage of development (Table 1). The followings are the account of the household-wise and village-wise differences, respectively.

²⁶ In this sense, the past studies, except Barney (2005), overemphasized the state and the industry's control over villagers.

Table 1: Rural transformations in the case study area

	Thai economy	G village (lower income, fewer eucalyptus farm)	P village (higher income, more eucalyptus farm)
The 1 st phase (1980s-92)	High economic growth	The diffusion of HYV of rice, fertilization	The diffusion of HYV of rice, fertilization
The 2 nd phase (1992-96)	High economic growth, wage hike, low cassava price	Use of power tiller, outmigration to the urban area	Use of power tiller, peddling business, land transaction, direct-seeding of rice, eucalyptus planting
The 3 rd phase (1997-1999)	Economic crisis	A few uprooted eucalyptus	Land transaction (include eucalyptus farm)

Source: Ubukata (2001)

“1) The (*eucalyptus*) owner tends to hold more land with less family labor in farming than the non-owner. The difference is slight, however, in land-labor ratio when compared to non-owners with upland fields. 2) The owner tends to have more assets, and to engage in profitable and stable non-farm occupations that use vehicles (i.e. peddler, driver, middle man, etc.). In terms of non-farm occupation, however, there are a variety of reasons for application, causing mixed signs in the analysis. 3) The owner tends to apply direct-sowing techniques in rice cultivation” (*ibid.*: 427, italic word added).

“For villagers in P village, who have a tradition of peddling business and substantial assets, eucalyptus planting is one option for responding to rising wage rates and non-farm job opportunities. In G village, where villagers have less stable non-farm employment and lower assets than P village, however, only a few had planted eucalyptus. Most retain the cultivation of field crops and some even hold negative opinions about this tree” (*ibid.*: 434).

Thus, the eucalyptus planting by *some* villagers was a rational response to recent changes in the rural socioeconomic environment caused by rapid economic growth during the late 1980s and early 1990s, as well as the result of a policy shift by the state and strategic change of the pulp industry.

Incidentally, policy change, industrial strategic shifts and villager's response accompanied the establishment of market systems from growers to the firms. Actually, decades of export-oriented economic development and the development of public infrastructure in the region enabled them to utilize the already existing agricultural market systems and road network.²⁷ As a result, arm's-length markets from producers via middle men to factories were established, which is typical of the markets for other agricultural commodities (Figure 2). However, the eucalyptus market is somewhat different in terms of bargaining power of a single dominant buyer: the pulp mill.²⁸ Some estimated that 72 per cent of the total regional supply finally flows to a mill in the northeast (Suksard and Thammincha 1995).

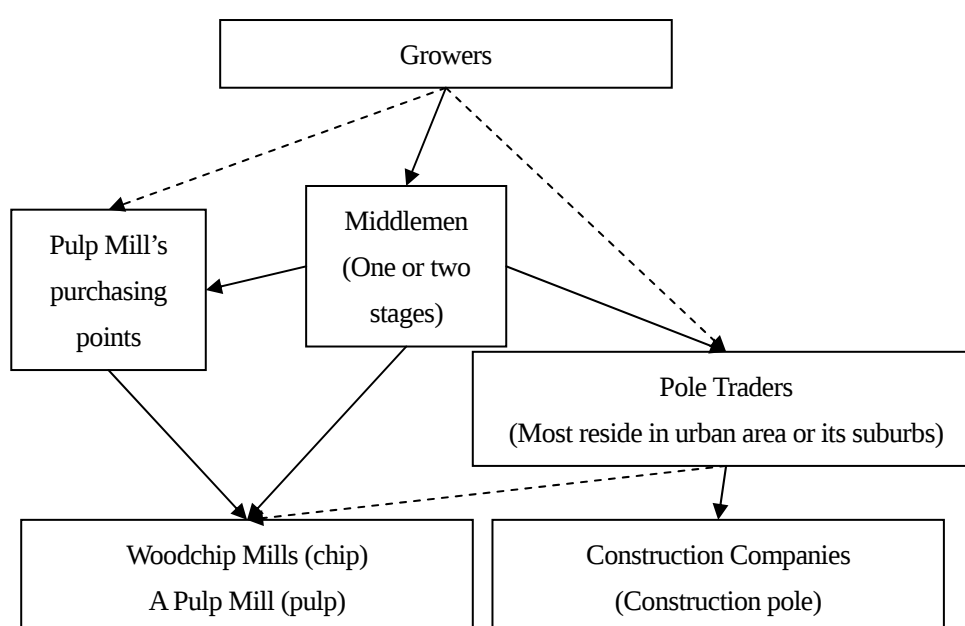


Figure 2: Market Systems in Eucalyptus Trees in Northeast Region

Source: Field surveys and Suksard and Thammincha (1995)

Note: Arrows indicate major directions, while dotted arrows show minor destinations. Middlemen here range from those of village-based part-time occupations to those of full-time professions.

The above analysis indicates that farm-based system was the institution of both

²⁷ Fuglie (1989), who pointed out “Vent-for-Surplus” nature of agricultural development in the region, emphasized these institutional legacies as “indirect effects” of trade and the development. On the other hand, the public infrastructure in the region, such as road network, had developed during the 1970s to deal with insurgency problems.

²⁸ In case of sugarcane, the mill dominates in the raw material market. It is said that the mills ensure the supply by allocating certain amount of quota to peculiar intermediaries called “quota-men” (Fukui and Sumipan 1998).

production and market that could evade the social conflicts regarding land acquisition, even though the fragmentation of farms entailed larger transportation costs. In this sense, it can be said that the selection of the farm-based system was a second choice by the state and the industry, as previous studies suggest. In the transformation process, however, both institutional demand and supply conditions mattered. For some villagers, eucalyptus planting was a rational response to recent changes in the rural socioeconomic environment caused by rapid economic growth during the late 1980s and the early 1990s. The industry could utilize an institutional legacy of agricultural market system from growers via middlemen to the firms.

Without these supply factors in the village economy and market systems, the state and the industry could not have shifted toward farm-based system easily, even though this system came to be more beneficial in that it could lower the transaction costs (or social costs) for the firms, given the sociopolitical setting. After the active introduction of this production system, new open conflicts regarding anti-eucalyptus farm forestry have rarely occurred, though villagers' land disputes associated with the past eucalyptus plantation has persisted and occasionally thrived.²⁹ By this introduction, the political arena of eucalyptus also shifted from land and forest into the industry.

It seems that this transformation finally followed a historical path of peasant domination in the agrarian structure of Thailand. However, when we regard the eucalyptus problems as industrial ones, two different aspects vis-à-vis the other agricultural commodities can be pointed out. One is the characteristics of eucalyptus production, including ecological aspects. In addition to the growers' (owners') characteristics mentioned above, agro-ecological aspects of eucalyptus affected their decision making of planting eucalyptus trees (though minor reason). The other is the market structure of the pulp industry. Contrary to the case of other agricultural commodities, this system accorded considerable monopoly power to the pulp mills. By analyzing the transformation of farm-based system during the economic crisis, the author focuses on these points in the next section.

8. Eucalyptus Production, Market, and the Pulp Mill during the Period of Economic Crisis

8.1. The Problems of Production and Ecological Aspects

This farm-based system was tested by the 1997 economic crisis both in terms of

²⁹ It is likely that farmers' organizations and NGOs had shifted their framing of the movements thereafter, though they have continued to take critical stances. One of the emerging issues of movements is farmers' debt problem.

production and marketing. First, problems emerged in the farm level production. At the time of economic crisis, most of eucalyptus trees planted during the early 1990s were matured enough to cut and send to the pulp mill. The above case study shows there was a sign of a differentiation of eucalyptus management—withdrawal from the management on one hand, and accumulation of eucalyptus farms on the other (Ubukata 2001). Through land transaction, well-to-do villagers that have stable incomes have accumulated eucalyptus farms.

Poor performance, lower profits than expected, a high cassava price in 1998, and the decreasing trend of eucalyptus price (in real value) after the crisis are the causes of these withdrawals. The most serious problem was poor performance of eucalyptus stands, which was likely the result of infertile soil, mismanagement, and fire damage.³⁰ Soil condition was poor, as salinization had taken place in some P village areas since the 1980s. Most villagers plant eucalyptus with narrow spacing (i.e. 2m by 2m), and did not care trees after planting.³¹ After planting, fire from neighboring fields often caused damage to the trees. As mentioned above, it is said that eucalyptus can rehabilitate degraded land with infertile soil where crop production is poor. At least in this case, however, the low potentiality also lowered the performance of the eucalyptus, and hence its profitability.

Some may think that longer rotation period may mitigate such poor performance. This, however, is not a viable option for poor villagers, for it raises opportunity cost of land, as well as fire risk. On the other hand, wealthier villagers can wait longer to see the growth and market trend. In P village, it was one of the wealthiest villagers who had the oldest eucalyptus farm (seven years at the survey year). Contrary to the villagers' initial expectation, eucalyptus did not necessarily turn out to be a desirable crop for small-scale farmers (*ibid.*).³² Its economies of scale and relatively long gestation period had differentiated the management.

This negative aspect of eucalyptus production to ordinary villagers may be exacerbated by their persisting perceptions of agro-ecological impacts. In fact, planting eucalyptus did not mean that the villagers came to hold positive perceptions on these aspects. As mentioned in the section of anti-movements, many villagers felt that eucalyptus damages

³⁰ See Ubukata (2001) on the calculation of the yield estimates.

³¹ The narrow spacing may cause low growth performances. According to the nationwide study by Sunthornhao (1999), an average growth of eucalyptus trees with 2m by 2m spacing was lower than those in wider spacing. In fact, this spacing was the one of which the RFD had promoted to villagers. This fact may indicate that the knowledge base of forestry extension was very weak.

³² However, due to relatively egalitarian structure of landholdings and absence of landlessness, the problems is likely to be less severe than in India during the 1980s, where the planting prevented both land leasing to tenants and employment of landless labors. As for the Indian case, see Saxena (1994).

water and nutrients in the soil, despite the state's continuous efforts to emphasize its harmless nature.

In contrast to the scientific discussions by the state and the industry, their judgment was based on direct field observations or indirect information from their friends and neighbors. They heard the crop nearby had been negatively affected. They witnessed it was fast-growing and very aggressive. Once planted, uprooting was very hard task for them for the root stretches deep into the soil, making it difficult to change crops. They claimed that weeds did not come up after trees were planted. Such information was quite common and reliable among them. In contrast, scientific information on eucalyptus provided by the state seemed unreliable to them. For example, asked about effect on crop yield, one grower in Chaiyaphum province who took a training course of tree plantation by the RFD anxiously replied that, "According to the training course...eucalyptus is not harmful..." (Author's interview, June 2000).

In fact, science may provide alternative explanations to their observation and claim. For example, narrow tree spacing technique (2m by 2m) that most of them apply might be one of the reasons for the absence of weeds. Improper site selection can also cause this effect, and simple crown closure can inhibit weeds to grow. Moreover, the weed absence may not necessarily indicate the deterioration of soil and water. By the comparison in the *ceteris paribus* situations factor by factor, we may identify causal factors for weed absence.

Such situations, however, are rare in the actual settings. More importantly, factor by factor analysis may underestimate composite effects of these factors, as modern medicine system does. In contrast, villagers' system of knowledge is more holistic, site specific and experience-based. Even though the state makes a serious effort to promote scientific evidences, it would be unreasonable for villagers to consider these contingent situations. Therefore, it is hard to alter the villagers' perception, because it is the situation that different rationalities are contesting each other, as Beck (1992) argued in his analysis on a risk society. In this sense, the state and the industry did not succeed in creating effective discourses that penetrate whole production system, while they had succeeded in re-arranging production relations to some extent.

Thus the negative aspects of eucalyptus production such as capital disadvantage and ecological problem to some villagers still persist. After the policy and strategic shifts, they just became more subtle than open conflicts between the state/private sectors and villagers. Nevertheless, some of those problems were originated by inappropriate site selection and techniques which were partly introduced by the state promotion. This

implies that some of these problems may be mitigated by introducing appropriate techniques or integration into existing farming systems.³³

8.2. The Problems in the Market and Pulp Mill

The eucalyptus markets also experienced great changes after the 1997 economic crisis. Before the crisis, the markets had developed rather steadily, holding the structures mentioned above. After the crisis, however, the situation changed suddenly and drastically into a recession.

After a decade of expansion, the regional supply of eucalyptus reached saturation at the time of the crisis. For example, the annual production capacity of the mill in the northeast at the time was approximately 200 thousand tons. According to this calculation, this production requires 888 thousand tons of raw eucalyptus timber per year.³⁴ If 62.5 tons of timber production per ha (10 tons per one rai) is assumed, the annual required harvest area would be 14 thousand ha. Considering the generally observed rotation period of five years, the estimated planting area required to meet the current pulp demand is approximately 70 thousand ha in the northeast.³⁵

The regional supply, on the other hand, far exceeded demand. According to Sunthornhao's (1999) data, approximately 94 thousand ha of private eucalyptus plantation area existed in the five northeastern provinces (Chaiyaphum, Karasin, Khonkaen, Mahasarakham, and Udonthani) in 1997. Adding the plantations by the RFD and the Forestry Industrial Organization (FIO), the figure increases to more than 104 thousand ha.³⁶ Demands other than pulp were not likely to fill this demand-supply gap.

The demand for construction poles, another large market, also went down due to the subsequent recession in the construction industry. As a result, sales of local pole traders also went down, and some were forced to end operations.³⁷ In Khon Kaen, for example, two of four surveyed pole traders ended operations during 1998-1999. Thus, the market share of the pulp mill was further increased, and its bargaining power was strengthened

³³ For example, one tree spacing technique that promoted by the RFD (2m by 2m) does not provide good production, nor is it ecologically sound. There is more room for improving productivity through combining tree planting with existing farming practices. In this regard, Hayami's (1996) view that tree plantations do not have increasing return to scale because peasants often plant trees in land with few opportunity costs is very interesting (see footnote 6). In fact, paddy-bund planting is one of the practices that can commonly be observed in northeast region. This allows smallholders with less opportunity costs and negative ecological disturbances. The authors' interviews to the villagers also indicate higher satisfaction rate with lower gross profits (Ubukata and Akarapin 2007).

³⁴ For the assumptions underlying the calculation, see Yamashita *et al.* (1999).

³⁵ Simple even-age distribution is applied for quick calculation here. Based on Sunthornhao's (1999) age-distribution data, however, Barney (2005) suggests highly skewed age-distribution that concentrate the supply in a few years around the crisis period, which makes the matters worse than even-age distribution.

³⁶ See FRC (1989) for the area planted by the RFD and FIO.

³⁷ These traders often acted as middlemen in the pulp market.

after the crisis.³⁸

Selling to the pulp mill became more unfavorable for tree-growers and middlemen as it changed its mode of payment from direct payment to payment by check in 1997. Many middlemen, who were short of cash to pay the growers, had to sell the check immediately at a certain discounted rate. The real price fell, and at times, they seemingly reflected producer's price for the eucalyptus stands. Thus, in contrast with the pulp mill, the bargaining power of middlemen and growers was weakened throughout the process, which forced them to accept unfavorable conditions.

While some may believe that the pulp mills were complete winners in this process, in the broader context, they too faced substantial problems with their own system of raw material supply.³⁹ As stated above, the pulp industry is famous for its capital-intensive nature, which can largely benefit from economies of scale. The farm-based system, however, entails greater transportation costs in expanding the production capacity, which limits market competitiveness. Actually, Phoenix cites this unavailability of large-scale raw material as the reason why the Thai pulp industry cannot construct mills of a world-standard scale (Paper Asia 1993, quoted in Yamashita *et al.* 1999). As for the pulp and paper industry, the import tariff was lowered to less than five per cent for intra-ASEAN trade in 2003, because of the ASEAN Free Trade Area's (AFTA) Common Effective Preferential Tariff (CEPT) scheme (ASEAN homepage). Therefore, stronger competition both inside and outside ASEAN can be expected. Given this dilemma, the Thai pulp industry has to improve its international competitiveness in the free market economy.

In fact, the current trend of the industry suggests that it overcame the recession after the economic crisis by adapting the post-crisis economic situation, by compensating low domestic demand with export. To increase competitiveness, several strategies are in operation. Some have tried to differentiate the products from, say, Indonesian products by emphasizing its quality and environmental consideration (Nawikakon 1999: 48), as well as the expansion of the production capacity. Advance Agro, the leading pulp and paper producer in Thailand, emphasizes its intensive care of environment and calls its products "farmed trees" (Advance Agro's homepage). It also created "Double A" brand in order to boost export (The Nation, July 25, 2007).

³⁸ This demand-supply gap forced middlemen to queue their trucks in a long line in front of the pulp mill gate for unloading their eucalyptus trunks (Bangkok Post September 6, 1999).

³⁹ The other problem during the economic crisis is, of course, the financial problem of these companies. For instance, Advance Agro plunged into huge debt at the time, totaled more than 22.6 billion THB (The Nation, July 25, 2007).

The others are trying to consolidate the industry, and looking into the cross-border expansion in order to pursue the economy of scale. Siam Pulp and Paper's move to purchase Phoenix Pulp and Paper in 2002, Thai Cane Paper in 2003 and its subsequent expansion into Southeast Asia is basically on this line of action (The Nation, November 1, 2002; January 24, 2004). As it moves to expand its production capacity, how to ensure the raw material supply becomes a problem again. Highly skewed age-distribution of existing tree plantings is exacerbating the shortage. It is said that the current raw material supply in Thailand has already been a tight condition (Bangkok Post, April 26, 2004, Barney 2005).⁴⁰ The government has moved forward to cut import tariff for eucalyptus in order to encourage the industry to utilize imported raw material from neighboring countries (The Nation, July 5, 2007). At the same time, the industry is launching investments in plantation businesses in neighboring countries such as Laos and Cambodia (Bangkok Post, May 9, 2008). It is noticeable that many investments in these countries do not apply the farm-based system, but plantation-based system, as the regulations and social pressures supporting villagers are not strict and ineffective. As Thailand and its neighboring countries become integrated through the Greater Mekong Sub-region (GMS) and AFTA initiatives, this trend may increase.

These attempts seem to bear fruits for the meantime. However, it does not mean that it overcame its structural dilemma. Constrained by their own supply system of raw material, there is a limitation to domestic consolidation, while international expansion bears some unexpected risks,⁴¹ and is increasingly on target of NGOs' critique. The same old social conflicts between villagers and the state/firms are emerging in these countries (Kuaycharoen 2008). Still being relatively small, the industry must continue to find its way by finding market niches and product differentiation. Now, the farm-based production system comes as both a blessing and curse to the industry.

9. Conclusions: Between Social Costs and Scale Economy

This paper examined how the pulp industry in Thailand has developed farm-based supply system of its raw material, and how its strategic shift from plantation-based to farm-based system caused the dilemma of choice between the two supply systems of raw material within the conditions of free market economy. It showed a complexity of politics on this

⁴⁰ There are two ways for the pulp mills to tackle this problem domestically. One is to re-adjust the contract and marketing system so that the industry can exercise more control over the supply of the raw material. In this sense, the marketing system of sugarcane is very suggestive in the future (see footnote 28), and there is a sign to move toward this system. The other way is to pressure the state to reconsider the policy on large-scale plantations. The interviews to company officials by Barney (2005) suggest that this is also taking place.

⁴¹ There are still considerable risks to conduct this business across the borders. Barney (2005) vividly introduces company officials' accounts on these aspects.

issue, which goes far beyond the simplistic dualism of state-private control versus civic resistance expressed in the past studies. Particularly, it is important to emphasize the reflexive modernization process: both the ability and limitation of the state and market to adjust and make a different set of coalitions toward a new governance status, both in terms of discourses and institutions.⁴² Here the author first refers to each of them, and finally provide prospects for the future direction.

9.1. The Ability of the New Coalitions

I would like to point out three important factors that facilitated or forced these new coalitions. First, it is apparent that the high social costs that resulted from the anti-eucalyptus movements during the late 1980s succeeded in crowding out the firms' and the government's first strategy to ensure a plantation-based supply system of eucalyptus, and forced them to select second-best strategy: a farm-based supply system. After this shift, the political contests in the industry became more subtle.

Further, it seems that the socio-political situation in Thailand during the late 1980s and the early 1990s, characterized as the development of civil society as well as the closure of "exit" options from oppressive tenure regime by the end of land frontier, had triggered political "voice" (cf. Hirschman 1970, Christensen and Rabibhadana 1994) which partially affected state policies and the behavior of firms. Such changes did not occur in resource-abundant countries such as Brazil, South Africa and Indonesia, where the industry mainly manages its own plantations to ensure stable supply of raw material. It is said that the local protests, pressures and cooperation from international NGOs had drove major pulp mills in Southeast Asia to introduce cleaner production technologies during the 1990s (Sonnenfeld 2000, 2002). Thus, it may even be said that pushed by social pressure, a unique market system which, to some extent, lessens the negative social (and in a limited sense, environmental) impacts of the industry have emerged as a result of readjustment of production relations, as suggested by ecological modernization theory (cf. Mol and Spaagaren 2000).

Second, the study found that this 'demand-side' analysis alone could not enough explain some of the important aspects on this process. Casual factors related to the state, villagers, and market were equally important. For instance, socio-political situations after 'the Bloody May' events in 1992 that led to the creation of Anand Panyarachun's second transitional government created political opportunities for the movements and made significant contributions to this shift. In addition, de-contextualization of ecological issues by "scientific" discussions among the experts provided official legitimacy of eucalyptus

⁴² In this regard, see Agrawal (2001) for the state-community coalition and Rigg and Nattapolwat (2001) for villagers' embracement of global market.

planting. Under this condition, some villagers accepted to plant eucalyptus in response to the rapid rural socioeconomic changes during the early 1990s. Agricultural market network, which is the product of the past trade and economic development together with the development of the public infrastructure, had also made a significant contribution to establish the new system. The importance of these ‘supply-side’ factors has largely neglected in the previous studies.

Third, the historical path of institutions and resource endowments is also likely to do matter, if we compare the dynamics of production relations internationally. Together with above-mentioned supply and demand factors, these may provide better explanations on the international differences of the governance status of the industry. Taking cases of Thailand, Indonesia, and Philippines, Hayami (2000) argue that the differences of land policy, i.e. the preferences toward peasants and plantations, determined the historical path of the agrarian structure, and hence its performances. He also pointed out that the plantation system in the insular part of Southeast Asia was highly effective system in the initial opening up process of land-abundant economies, but the recent shift toward the land-scarce stage in the area highlight the tendency of the relative disadvantages of that system. Facing active protests by the civil society and democratization in this area may be counted as one of these disadvantages, which has recently prompted the pulp industry to take measures to involve villagers into the production process. However, studies in Indonesia show that this move is not an easy task (e.g. Collins 2001, Levang and Sitorus 2006). In addition to the resource endowments and history of land policy, there are three additional related factors that are likely to affect the differences of production relations vis-à-vis the Indonesian industry:

- 1) The scale of the industry: The high potential of the industry can require huge amount of capital inside the industry, both domestic and internationally. Being large-scale, Indonesian pulp industry may have difficulty ensuring a stable supply of raw material by farm-based system alone. Public infrastructure and marketing systems may further inhibit the establishment of this type of system.
- 2) Crop availability: In northeast Thailand during the 1990s, where the climate condition is drier, farmers had few crop options that offered sound profit. In contrast, rubber and oil palm growing is much more profitable for Sumatran villagers than tree growing for pulp industry. This crop availability due to the climate differences is one of the difficulties the industry has in encouraging villagers to become involved in the production process.
- 3) The differences of rent-seeking structure regarding the industry: In Indonesia, forestry sector was regarded as one of the outstanding “off-budget” activities for the “crony” of the President Suharto to capture the resource rent and subsidies,

while balanced fiscal budget policy had been exercised in the central government (Asher 1999, MacIntyre 2002). It is reasonable to assume that this highly concentrated power structure, together with its industrial scale, had facilitated the oligopoly of the industry and helped to maintain rigid plantation system. In contrast, Khan (2002) refers to the competitive structure of the coalitions of entrepreneurs, bureaucrats and politicians in Thailand. It might prompt continuous entry of the new agents and political rivals to capture the rent during the 1990s, hence forming relatively competitive industrial and political structure until recently, as shown in the case of exposure of political scandals and its involvement of the industry during the late 1980s-early 1990s.

In any case, it is highly likely that different governance structure will emerge in the Indonesian pulp and paper industry.⁴³ Additional comparative studies may help further understanding of the differences of the governance status of the industry.

9.2. The Limitations of the New Coalitions

As well as the possibilities of the new coalitions of the industry, the study also found many of their contradictions, and hence the limit of applying ecological modernization in this context. These contradictory aspects become clearer when we look at the production relations of the industry than we simply focus on the technology. One of them is that this unique system had a weakness in terms of scale economy in both eucalyptus and pulp production. A field study suggests that the differentiation of eucalyptus management has been in progress in the villages. Market saturation and the 1997 economic crisis also worsened the market conditions for planters. Even the pulp mills, which have dominated the regional eucalypt market, constrained their production capacities through their own supply system of raw material, with which they were unable to generate sufficient scale merit to enhance their market competitiveness. It is also important to note that these new coalitions have accompanied the industries' escape from domestic locations to neighboring countries in which the regulations are loose and ineffective in order to "exit" from the "voice" (Carrere and Lohmann 1996, Hall 2002, Kuaycharoen 2008).

In addition, the negative ecological perceptions of eucalyptus also strongly persisted, despite the state's efforts to promote "harmless" nature of this tree crop. It is appropriate to say that discourses (both official and grassroots) remain unchanged, while institutional arrangements of the industry have changed. At the same time, media reports on wastewater pollution from a plant also cause a negative image of the industry (e.g.

⁴³ A "complicity" of firms and villagers in the development of peat swamp forests can be this coalition. Still being resource-rich, and with recent land management technique, they can utilize such Vent-for-surplus situation to solve governance problem.

Bangkok Post, July 21, 1998, The Nation, October 12, 2001).

As a result of these limitations, firms in the Thai pulp industry in the free market economy always face a choice regarding whether to follow a plantation-based or farm-based system. This choice is influenced by the tradeoff between social costs and scale economy. For the firms aiming to survive under the free market economy and for the state to promote industrial development, the motive to choose the plantation-based system is always present, if the profits are large and the social costs are relatively hidden. The fact that the government tried to relax the restriction on leasing NFRs when Advance Agro agreed to the attractive Chinese offer for pulp export is a typical example of such politico-economic motivations (e.g. Bangkok Post August 24, 1999, Kuaycharoen 2004, Lang 2002).⁴⁴

This vulnerability of the market system is not observed in the case of other agricultural commodities. The specific attributes of the pulp industry that require a tradeoff between scale economies and social costs, and the attributes of eucalyptus farm forestry that lie in the categories between agriculture and forestry are the crucial factors that create this vulnerability. Moreover, it may partly be a result of the current sociopolitical environment in Thailand that allows freedom of expression and social action as well as its rural society in which small-scale family farms dominate agricultural production. Currently, the Thai pulp industry enjoys favorable market conditions of pulp. But this intrinsic structure persists and will be a matter again within the industry under the free market economy.

9.3. Future Directions: Going Beyond Dilemma or a Seesaw Game?

As the author summed up above, the transformation of the Thai pulp industry can be regarded as a limited, incomplete, and contradictory process of ecological modernization (cf. Sonnenfeld 2000). From this perspective, there are two possible contrasting future directions: pushing ecological modernization further, or restructuring the overall process.

The strategies of the former direction will be toward more productive, equitable and environmentally sound production system of production, such as the further adjustment of the marketing system, the introduction of environmentally sound production facilities, R&D on tree improvement, establishment of both efficient and ecologically sound integration into villagers' farming system, securing land tenure, and rearrangement on terms and conditions of contract tree farming system. On the other hand, the main strategies of the latter direction will be toward further restructuring of the industry by switching sources of raw material, restructuring capital intensive nature of modern pulp

⁴⁴ This offer had not been put into practice as it is faced with strong social opposition.

and paper manufacturing, reducing consumption of the paper by increasing consumer's awareness of the problems of the pulp and paper industry.

Given the current conditions of the industry, the latter process is very hard to attain in the short term, though it includes some important elements to consider for the long term.⁴⁵ Thus the former path is more dominant and more likely to continue, while the latter strongly persists as a critique. Here, it is also important to mention that the very existence of the latter is a prerequisite for the former: Without active movements as well as other casual factors, the Thai pulp industry might have gone toward the plantation-based production system. In this sense, active civil society and a responsive state are very important.⁴⁶ Given this actor configuration and intrinsic dilemma mentioned above, the former path will continue to take place though the dialectic process or mere seesaw process.

Whether this process would be regarded as dialectic or seesaw will be, at the moment, difficult to evaluate. While the proponents of ecological modernization may take the former position, some might argue that this situation is what Gould *et al.* (2008) calls "treadmill of production" in which "a growing level of capital available for investments and its changing investment allocation together produced a substantial increase in demand for natural resources" (*ibid.* 2008: 7), and "economic elites increasingly dominate all aspects of society and the environment unless checked by grassroots social movements" (Mol and Sonnenfeld 2000: 9). This is not to say that there is no validity in regards to the latter model in this case, understanding the industrial process as mere seesaw game. Given its insufficient institutional and policy base and people's environmental legitimacy in support of livelihood approach (or environmentalism of the poor), it might be bold to unconditionally apply the former concept. Moreover, the issues are currently moving beyond the national border. A double standard situation, in which the industry pays attention to villagers in the country while it neglects them in neighboring countries, is emerging. The active protest by the civil society might be an only hope to close this "environmental haven" (cf. Hall 2002) and alter the situation. Reconsidering the trade liberalization of the industry may also be necessary to mitigate

⁴⁵ For instance, switching sources of raw material into annual fiber crops or crop residues can be one direction to move beyond this dilemma, while current technological lock-in and capital investment is likely to prevent, at least for short and medium term, the industry from applying this strategy. Focusing more on consumption and value chain may be another option that should seriously be considered, but it is not likely that total world consumption of raw material can be curbed within short period of time. In particular, the increase of consumption in China may inhibit effectiveness of this option.

⁴⁶ In countries where formal regulations are weak and absent, informal social pressures are, in many cases, crucial for corporate environmental performance. See also empirical studies such as Pargal and Wheeler (1996) and Kagan et al. (2003).

negative effects.⁴⁷

The problems of tree plantation, particularly that of pulp and paper industry, permeates the developing world. At the same time, we cannot deny that we rely on these products in our everyday life. Moreover, climate change and deforestation is becoming global agenda. These facts urge us to restructure both the production and consumption of forest-related products. The Thai case casts important questions about the way in which we reform the industry. As mentioned above, this transformation would be path dependent, according to ecological, social, economic, and historical factors. Further studies in other countries and international perspectives may help us further understanding the strategies of future directions toward more sustainable and equitable governance structure of the industry.

Acknowledgement

The author is grateful to Dr. Tim Forsyth, a reader in Development Study Institute, London School of Economics and Political Science. He kindly accepted me as a visiting scholar of the institute, and provided useful comments and suggestions. Thanks are also extended to Ms. Jennifer Dellegrazio for her excellent editing skills.

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