

Expansion of rubber (*Hevea brasiliensis*) in Mainland Southeast Asia: What are the prospects for small holders?

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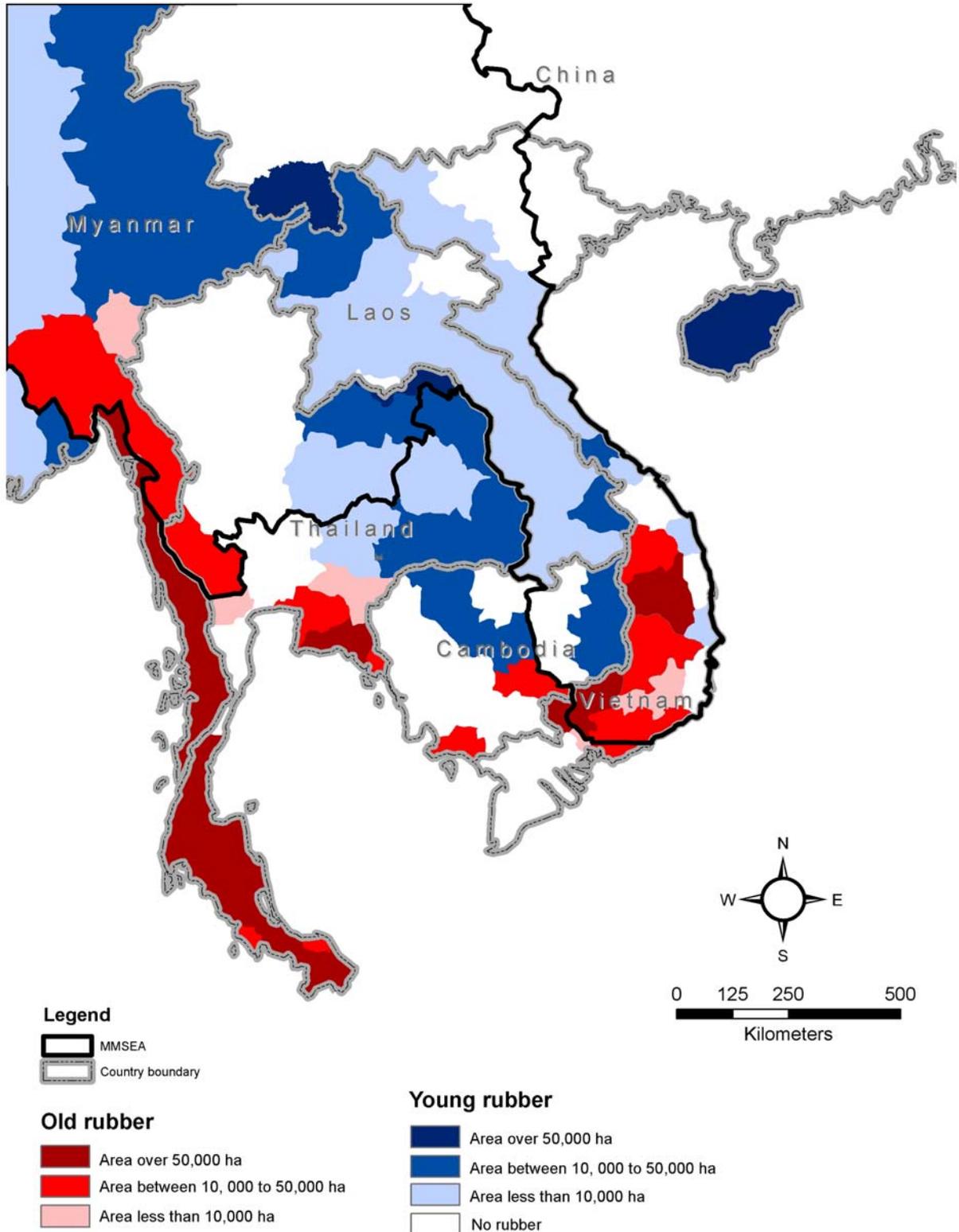
Abstract

The rubber tree is native to the humid tropics and has traditionally been cropped in the equatorial zone between 10°N and 10°S; in mainland Southeast Asia this includes portions of southern Thailand, south-eastern Vietnam, and southern Myanmar. In the early 1950s, the Chinese government began to invest in growing rubber in environments perceived to be ecologically marginal and eventually established state rubber plantations in areas that lie as far north as 22° north latitude. China's success in growing rubber in these 'non-traditional' environments expanded the habitat in which rubber could be planted and pushed it further north. Today entrepreneurs from China, Vietnam, Malaysia, and Thailand are investing in rubber plantations in areas of Laos, Cambodia, and Myanmar, northwest Vietnam, northeast Thailand, and Yunnan, China. The impact of rubber on smallholders, however, is not yet clear. Experiences in Xishuangbanna, Yunnan, China and northeast Thailand clearly show that smallholder rubber production is a viable and effective proposition in moving households and communities out of poverty. By contrast in countries such as Laos, Cambodia and Myanmar many farmers are struggling to maintain their lands and forests in the face of growing pressures from investors and government institutions to impose concession arrangements.

Introduction

The last several decades have seen the rapid emergence and expansion of high-value export-oriented crops across Southeast Asia. A central dynamic of this change has been the rapid growth of boom crops (Hall, Hirsch, and Li 2011). In the Central Highlands of Vietnam, de Koninck (2006) documented an extraordinary boom in coffee in response to world coffee prices. This boom was largely driven by smallholders rather than agribusiness and resulted in the conversion of large areas of garden, swidden, and forest land to coffee (Tan 2000, Trung 2003, Giang 2010.). In Indonesia and Malaysia the area under oil palm grew from 4.2 million hectares in 2000 to 7.1 million ha in 2009 with millions of additional hectares either in transition or set aside for future development (McCarthy 2010, Li 2011). Like Vietnam's coffee boom, the oil palm rush was driven by strong demand on the world market, but unlike in Vietnam the oil palm expansion was orchestrated more by agribusinesses and state agencies than smallholders. A similar boom in shrimp aquaculture occurred in Indonesia, the Philippines, and Thailand in the 1980s and 90s (Vanderveest et al. 1999, Hall 2004). Rubber plantations expanded rapidly in southern Thailand and Peninsular Malaysia in the 1970s and 1980s (Barlow 1997); but more recently rubber plantations have expanded by more than 1,000,000 ha in upland areas of China, Laos, Thailand, Vietnam, Cambodia, and Myanmar where rubber trees were not traditionally planted (Manivong and Cramb 2008; Li and Fox 2011; Ziegler et al. 2009) (see Fig 1 and Table 1). By 2050, the area of land dedicated to rubber trees could quadruple (Fox et al. 2012) largely by replacing lands now occupied by evergreen broadleaf trees and swidden-related secondary vegetation.

Fig 1. Traditional and non-traditional rubber growing areas in Mainland Southeast Asia based on provincial and state level statistics collected between 2007 and 2009.



Comparative work has been done on the ecology and history of crop expansion in Southeast Asia (Hayami 2001, deKoninck 2006) but little comparative work has been done on the political economy of boom crops across the region. An important exception being Hall's study of Southeast Asian shrimp aquaculture, which not only examined the ecology of these systems but the political and economic context under which they developed in Indonesia, the Philippines, and Thailand (Hall 2004). This dearth of comparative work is particularly striking when one considers the examples of coffee in Vietnam and oil palm in Indonesia and Malaysia where boom crops (both trees) were driven by smallholders in one case and agribusinesses in the other.

In this paper we describe the different types of rubber farming that are developing in portions of five countries, specifically southern China, Northeast Thailand, Laos, Cambodia, and Myanmar and explore the impact these systems are having on local livelihoods. In particular, we are interested in understanding why smallholder rubber production predominates in some countries while in other countries large-scale commercial plantations are becoming the norm. After a brief discussion of the growing demand for natural latex from rubber trees, the physical environments in which rubber trees can grow, and the historical role of smallholders in rubber production we present short synopses of government policies and historical events that have affected the expansion of rubber plantations in the five countries. These synopses are based on our own work in these countries and secondary sources.

Table 1: Rubber Estimates (2008): Non-traditional rubber growing areas

<i>Country</i>	<i>Area (ha)</i>
Northeast Thailand	343,063 (Rubber Research Institute of Thailand 2007)
Xishuangbanna, China	334,000 (Shen 2008)
Laos	140,665 (Douangsavanh 2009)
Cambodia	107,901 (ANRPC 2009)
Northeast Myanmar	68,723 (Hly Myint 2008)
Vietnam	58,100 (Nguyen & Nguyen 2008)
Total	1,057,452

Similar to the recent work of Hall, Hirsch, and Li (2011), we focus our lens on the changing ways in which people are excluded from or given access to land to examine the seemingly incongruous differences in the way rubber trees are farmed. We review and examine differences in land tenure regimes, state policies on land appropriation, the availability of agricultural extension services as well as state subsidies and low cost loans, and whether trade liberalization and regional economic integration policies affect the expansion of rubber and the roles of state/private commercial enterprises and small holders (see Table 2). We find that in places where land rights and support services are provided smallholder rubber cultivation is viable and profitable, and in places where they are not provided smallholders face a much more insecure future. The role of state policies and services for protecting and promoting the rights and interests of smallholders has a significant impact on their future.

A growing demand for rubber

Rubber is still a hot commodity. Since 1900 the world's consumption of rubber, both synthetic and natural, has increased at an average rate of 5.8% per year. Synthetic rubber accounts for approximately 57% of the total but natural rubber is cheaper and of superior quality for high-stress purposes. Jet and truck tires are almost entirely natural rubber. In 2010 rubber consumption grew at a rate of 15.3% after a decline in 2008 and 2009. In 2011 this rate fell to 4.8% in response to economic problems in the U.S. and European economies. The weakening in rubber consumption is expected to continue throughout 2012 before it is forecasted to reach a trough in early 2013 (Prachaya 2011).

Table 2: Policies affecting the ability of smallholders to grow rubber

	Yunnan China	Northeast Thailand	Ratanakiri Cambodia	Laos
Private Land Tenure or Usufruct rights	Limited ¹	Yes ²	No ³	Limited ⁴
Land Appropriation	Yes ⁵	Yes ⁶	Yes	Yes
Agricultural extension available	Yes	Yes	No	No
Subsidies available	Yes	Yes	No	No
Low cost loans available	Yes	Yes	No	No
Trade Liberalization	Yes	Yes	Yes	Yes
Regional Economic Integration	Yes	Yes	Yes	Yes

¹ Under what is commonly known as the Household Responsibility System (1978), farmers in China were assigned usufruct rights and the right to a residual income subject to certain tax and sales obligations. Under no circumstances can farmers alienate the land they have contracted from the village authorities, although some can farm it out on a short term basis and appropriate a rental income in return (Kung 2000).

² As a result of the changes in government policies at different times, there exists a host of institutions dealing with land issues and 10 different types of land certificates ranging from land use permits to firm land titles (Routray and Sahoo 1995). Landlessness and renting of land for cultivation are not very significant in Thailand, with 85% of farmers owning their land (Ruland 1989). By 1997 the Thailand Land Titling Project (TLTP), which began in 1984, had distributed over 5.5 million land titles, with over 10 million people being direct beneficiaries (Rattanabirabongse et al. 1998).

³ The 2001 Land Law prohibits the sale of indigenous lands but alienation of indigenous lands, both through sales and intimidation is occurring at an increasing rate throughout the province. Due to a lack of transparency within the Cambodian government structure, and a lack of established and functional procedures for land titling and transfer, illegal land purchases and the leasing of large economic concessions are increasing rapidly, often facilitated by local government officials in exchange for commissions (Fox et al. 2008).

⁴ The Land and Forest Allocation Policy (LFA) developed in the mid 1990s allocated usufruct rights to individual farmers to use agricultural and barren land. The LFA sought to increase land tenure and food security but also aimed to control the expansion of shifting cultivation in upland areas. Land allocated under the LFA and later on under the LUPLA scheme (Land Use Planning and Land Allocation) cannot be sold or used as collateral (Thongphanh 2003).

⁵ Han Chinese farmers from Hunan Province were resettled in Xishuangbanna in the 1960s to establish state rubber farms. Some 200,000–300,000 participants in the ‘‘Educated Youth’’ were assigned to quasi-military units of the ‘‘Production Construction Army Corps’’ in Xishuangbanna in order to open ‘‘wastelands’’ and to defend the national borders by expanding rubber plantation into the more extreme latitudes and altitudes. The influx of this large number of people displaced local people, who both lost their land or access to resources, and caused land tenure conflicts that continue until today (Sturgeon 2010).

⁶ In 1994 the government issued Decree No. 186/PM granting permission to businesses and private Lao citizens to invest in plantation agriculture or to support communities to develop plantations on their own land based upon common agreement (Thongphanh 2003).

As of March 2012 rubber was trading at approximately U.S. \$4.00 per kilogram, down significantly from a peak of \$6.18 per kilogram reached in February 2011, but significantly more than a 56-year peak of \$3.25 reached in the middle of 2008. Even if prices weaken again many smaller producing countries may find the price levels still profitable enough with their lower cost of production.

China surpassed the United States as the world's largest consumer of rubber in 2002 with an estimated 3.45 million tons or 18.2% of global consumption; and it is estimated that this will increase to about 30% and then remain constant (Prachaya 2004). It is likely that China will need 11.5 million tons of natural rubber in 2020 of which it will be able to supply about 4 million tons from domestic sources (IRSG 2004). It is predicted that China will increase its vehicle fleet from the current level of 10 million to 200 million by 2020, as household incomes rise and over 20,000 kilometers of new roads are built. India is also looming on the horizon to increase rubber consumption as its economy continues to grow robustly.

Rubber expansion to non-traditional marginal environments

Asia accounts for 97% of the world's natural rubber supply, with the vast majority coming from Thailand (31%), Indonesia (30%), and Malaysia (9%). The rubber tree is native to the humid tropics and has traditionally been cropped in the equatorial zone between 10°N and 10° S in areas with 12 months rainfall. In mainland Southeast Asia this included portions of southern Thailand, southeastern Vietnam, and southern Myanmar. In the early 1950s, China decided that in order to secure its economic development it needed to produce its own natural rubber. The Chinese government subsequently invested heavily in research on growing rubber in environments perceived to be marginal in terms of cooler temperatures and having a distinct dry season. State rubber plantations were eventually established in Hainan and Yunnan provinces in areas that lie as far north as 22° north latitude. China's success in growing rubber in these 'non-traditional' environments greatly expanded the habitat in which rubber was planted (see Fig 1). As scientists and farmers were beginning to realize that rubber trees could be grown in areas previously considered to be marginal or unsuitable, the boom in palm oil prices was driving an expansion of oil palm trees in areas where rubber was traditionally grown; for unlike rubber, oil palm trees are restricted to the humid tropics. In many parts of peninsular Thailand, Malaysia and Indonesia, rubber trees are being replaced by oil palm, and rubber is being pushed further north.

Today entrepreneurs from China, Vietnam, Malaysia, and Thailand are investing heavily in rubber plantations in non-traditional rubber growing areas of Laos, Cambodia, and Myanmar, as well as in non-traditional rubber growing areas of their own countries—northwest Vietnam, and northeast Thailand. The National Agriculture and Forestry Research Institute (Douangsavanh 2009) suggests that more than 140,000 ha of rubber have been planted in Laos in the last decade and that the plantation area may reach 300,000 ha during the next decade. In Cambodia, the Ministry of Agriculture plans to expand the area under rubber cultivation from 100,000 ha to as much as 800,000 ha by 2015. In Myanmar, the government has a 30-year plan to develop an additional 600,000 ha of rubber trees by 2020 with most of the expansion targeted in Kachin (56,000 ha) and Shan (145,000 ha) States (MPCE 2010 as cited in Woods 2011). In Thailand, rubber has expanded to include over 64,000 ha in the north and 348,000 ha in the northeast. The rubber growing area in Vietnam increased from 395,000 ha in 1999 to 550,000 ha in 2007 with 4,500 ha planted in the northwest region. The government has a target of 700,000 ha of rubber by 2020 (Table 1).

The place of smallholders in non-traditional rubber growing areas

In the largest rubber producing countries, the smallholder sector dominates production; smallholders produce 93% of rubber in Malaysia, 90% in Thailand, 89% in India and 85% in Indonesia (Rubber Board 2005) (Table 3). Rubber as a farm crop presents an interesting opportunity for smallholders as it can be intercropped on a short rotation making it more attractive than other plantation crops with longer gestation

periods. In addition, it can be intercropped both during the years before tapping as well as placed within the context of a longer-term agroforestry systems (Michon et al. 2007). Indeed, Viswanathan and Shivakoti (2008) suggest that rubber cultivation, when integrated into existing farming systems, can result in significant increases in household income and greater resilience in the face of volatile markets. Dove suggests (1993, 1994) that rubber is an ideal crop for small holders because it causes minimal competition between the production of rice and rubber in the use of land and labor. In principle these systems are complementary because rubber meets the need for market goods, while rice meets subsistence needs. In Indonesia small holders tend to abandon rice cultivation when rubber prices are high but return to it during economic downturns as was seen in 2008 (Lehébel-Péron et al. 2010). While the intensity of production of rubber grown in a diversified agroforestry system is lower than that of monoculture rubber (and may even vary inversely with market prices), rubber grown in an agroforestry system provides smallholders with independence from external economic and political influences, which has been the key to their historical success.

Table 3: Historically natural rubber has predominantly been a smallholders' crop

Country	Definition of small holder (ha)	Share of smallholdings (%)
Malaysia	<40.5	93
Myanmar	<8 (not legal limit)	90.5
Thailand	<40	90.5
India	<20	88.4
Indonesia	<25	85
Sri Lanka	<20	64
China		50
Vietnam		32
Cambodia		32
Laos	< 25	23

Patterns of rubber expansion in five Asian countries

Xishuangbanna, China

In response to military needs highlighted by the Korean War, the Chinese government introduced rubber to Xishuangbanna in the early 1950s as a strategic, industrial product to be produced on large-scale state collective farms. In 1955 the Bureau of Reclamation began to organize extensive land clearance using demobilized soldiers, often veterans of the Korean War, almost all of whom were Han Chinese (Yunnan Bureau of Reclamation 2003; Deng 1993). During the collective period in China, which in Xishuangbanna lasted from 1958 to 1982, farmers were organized into communes for agricultural production, including in upland ethnic minority areas, with state attention on labor, rather than land, as the important factor of production.

Between 1978 and 1983 the Chinese government implemented the Household Responsibility System which dismantled the farming communes and introduced a new ideology of land use, turning farm households into entrepreneurs responsible for caring for their own needs. Agricultural lands, such as paddy, were contracted out to individual farmers while forests remained under state control. In 1983, Yunnan Province implemented a policy called *liangshanyidi* (freehold and contracted forestlands and swidden fields) with the objective of stabilizing forestlands and swidden fields through land titling and

demarcation. The main goal of this reform was to shift forest management from the state to individuals for forest regeneration. Under this reform, both freehold plots and collectively held forests were leased or contracted to individual households who were given long-term use rights (Xu et al 2006).

A combination of domestic protection of rubber prices, the introduction of the Household Responsibility System, and the introduction of new technology all encouraged small-scale farmers to plant rubber as a cash crop, particularly during the period between the 1980s and mid-1990s. Under a major state campaign to encourage upland farmers to plant rubber at elevations below 700 m in fields used for swiddening, state farm personnel provided seedlings and technical training. Later, a subsidized state anti-poverty campaign encouraged farmers to plant rubber on sloping lands. In addition, the Chinese government initially protected domestic rubber prices. In the late 1980s, China terminated subsidies to state rubber farmers and reduced the tariff on imported rubber. These actions pushed both state and small-scale rubber farmers to compete in the international market.

In 2002, the 'Grain for Green' campaign was introduced to promote the development of China's western provinces and protect the environment; this program provided farmers with grain for eight years if they planted forest cover on degraded slopes. In Xishuangbanna, the authorities decided to count rubber trees as forest cover. About the same time, a rapid rise in rubber prices occurred. Eager for wealth, households began planting rubber in their traditional woodlots, in village forests, and on the remaining and steeper slopes. Below 700 m, but even higher, rubber became ubiquitous.

Today, rubber farmers in Xishuangbanna have achieved unprecedented wealth. Janet Sturgeon (2010:325) quotes an Akha rubber farmer as noting that 'Money is the most important thing; money makes everything possible.' That 'everything' includes sending their children to high school, and for some, on to university; buying insurance for retirement and health care; and even a holiday in the city for an entire village. Indeed Sturgeon argues some ethnic-minority rubber farmers in Xishuangbanna have achieved a standard of living today that has more in common with middle-class urban residents than with most fellow farmers.

Northeast Thailand

In the 1970s the Thai government decided to investigate the possibility of introducing rubber in the northeast as a viable commercial tree crop, especially as an alternative to cassava production. Successive governments have sought to relocate the epicenter of the rubber industry to the northeast region, thereby freeing land in the south for palm oil production. The Thai national government supported the development of infrastructure and services such as the Buriram Rubber Research Station and the numerous Offices of Rubber Replanting Aid Fund (ORRAF) found throughout the northeast. In addition, many farmers in the northeast worked as tappers on rubber plantations in southern Thailand and learned the skills required to grow, harvest and produce rubber sheets. Douangsavanh et al. (2008) estimated that about 70% of the hired labor force working in the rubber industry in the southern Thailand was from the northeast.

ORRAF is a unique feature of the Thai rubber growing program. Established as an agency of the Thai government in 1960, ORRAF was initially designed to support rubber smallholders in South Thailand in expanding rubber production and diversifying into other crops to buffer economic risks linked to international price fluctuations. Funded through export taxes collected from smallholder rubber producers ORRAF assists smallholders by providing free or subsidized inputs and credit. Beginning in 1989 ORRAF provided smallholders in the northeast, those with less than 2.4 ha (15 rai) of land, with technical advice, free seedlings and fertilizer, low-cost credit for labor costs (including family labor), material inputs (especially herbicides), and other income generating activities. Since 2004 ORRAF provides technical advice on cultivation and free seedlings to households with up to 1 to 1.25 ha (6-8 rai) of land. ORRAF

also supports smallholder activities such as fish ponds, livestock, crops, and handicrafts in order to aid farmers to maintain their livelihoods between the time they plant rubber and begin to tap. ORRAF assists households with extension information, provides low-cost credit, and supports community organizations and the formation of rubber cooperatives. The low-cost credit ORRAF makes available for rubber cultivation comes from the Bank of Agriculture and Cooperatives (BAAC). These funds pay for labor, fertilizer, and other materials.

The assistance ORRAF provides coupled with the considerable experience farmers in the northeast had with commercial agriculture and their experience growing rubber in southern Thailand were important factors in the expansion of the rubber industry under a smallholder model. This support policy resulted in a specific pattern of rubber expansion around nucleus villages targeted by ORRAF interventions. During the first 7 years of the extension program, a few volunteer households typically received extended support in the form of planting materials, technical advice and training, free of charge. These newly created rubber smallholders often used the rubber income they received to expand their rubber holdings beyond that supported by ORRAF and to support the adoption of rubber by neighboring villagers who were attracted to their success. The first wave of rubber growers usually played a key role in building up social capital and managing rubber cooperative structures. Once these rubber institutions were firmly established and fully functional, ORRAF would withdraw its support to the local community and develop its program in other areas. This experience also helped farmers to develop marketing channels and establish a viable marketing system across a network of ORRAF supported rubber cooperatives. As in Xishuangbanna, with secure tenure rights and the support of government programs such as ORRAF, smallholder rubber farmers in Northeast Thailand have greatly increased their household wealth.

Laos

The history of rubber production in Lao PDR is relatively short, with expansion of the industry having occurred in the last decade. What began as a modest supplemental farm enterprise to enhance livelihoods for upland farmers in Lao PDR has grown into a rapidly expanding agro-industry that is becoming shrouded in mounting concerns over a lack of governmental regulation and controls (Douangsavanh et al. 2008).

Due to the immature nature of the industry government officials in Laos have relied on external inputs of knowledge and investments from state and private entrepreneurs from neighboring countries, particularly China, Vietnam and Thailand. These investments have triggered a sudden and huge increase in rubber planting, especially in northern and southern provinces. As a result of poor governmental regulations and enforcement strategies, a large range of institutional arrangements for rubber production have emerged in recent years. The Lao government categorizes these arrangements as smallholders, contract farming, and concessions with a number of variations in each type according to who provides the main factors of production (i.e. land, labor, capital, market outlet and technical knowledge). How contracts and concessions are negotiated between farmers, companies, and government agencies greatly influences rubber trajectories at the village level. Investors prefer the concession arrangement as a way to protect their investments; smallholders are concerned that these arrangements limit their access to knowledge, land, and profits.

Normally only applied to state land, concessions are negotiated by senior government officials and large tracts of land left under direct management by a company with limited interactions with local populations. Labor is frequently of foreign origin, which limits the transfer of technology to local farmers. In some cases, companies are allocated rights to prospect and negotiate with villagers for land deemed physically appropriate and accessible, but whose availability is uncertain and subject to local approval. The resulting model of rubber development is then a joint venture between foreign investors and farmers in a contract

farming arrangement. Inputs and profits are supposed to be shared as determined by negotiations among investors, district authorities, and village representatives.

Two main kinds of contracts can be identified: 1) a '2+3' model where farmers provide land and labor, and the company provides capital (in the form of seedlings, fertilizer and other equipment), technology, and access to markets; and 2) a '1+4' model where farmers provide land and the company hires labor (perhaps the contracted farmer), provides capital, technology, and market access. When the trees become productive (approximately 7 years after planting) benefits are shared according to conditions agreed upon in the initial contract—under '2+3' usually 70% of the benefits go to the farmers and 30% to the company, under '1+4' usually 30% to the farmers and 70% to the company, sometimes benefits are split equally. The government, eager to support the emergence of a smallholder-based rubber industry, has actively promoted the '2+3' model, while the investors eager to secure their investment and profits have pushed for the '1+4' model. If farmers become too indebted waiting for their trees to become productive (7 years), investors can acquire the farmers' land tenure rights and convert them into concession-type tenure.

Smallholder rubber arrangements, however, can emerge even in places where rubber companies are actively promoting other institutional arrangements. Farmers with relevant knowledge (e.g. many villagers located close to the borders with China and Thailand have worked on rubber farms in these countries), capital (e.g. better-off farmers with good relations with district authorities) and agency (e.g. belong to farmers' groups) can negotiate advantageous arrangements that limit the role of investors as credit providers, or even resist companies' offers if they have already secured market access on their own (e.g. villagers in Sangthong district as documented by Castella et al. 2008).

Other issues that plague contract farming include inadequate village consultation, varying degrees of coercion, inconsistent understanding and interpretation among contracting and governing parties, low levels of technology transfer from investors to villagers, and disputes over land and wages. Contracts between foreign investors and farmers are often vaguely written or non-existent, and pose a major concern for farmers because it is unclear who will benefit from the profits of rubber planting. The notion of a contract and its sanctity are not well understood by either investors or farmers in Laos. For example, some contracts are not legally binding due to lack of jurisdiction. In development projects involving land concessions, several undesirable aspects have emerged: e.g. uncompensated loss of assets, both private villager assets and state/public assets; uncompensated loss of resource entitlements by villagers (e.g. non-timber forest products) and of public goods (e.g. watershed protection services) by the state; and configurations of resource use that secure resource control but decrease net benefits, and that in doing so fail to capitalize effectively on the overall comparative advantages of the country (Douangsavanh et al. 2008; Baird 2010).

Cambodia

The development of rubber plantations in Cambodia can be traced back to the early 1910s during the French protectorate. By 1937, Cambodia's rubber plantations constituted approximately 20 per cent of the total rubber plantation area in Indochina. After independence in 1953 the sector remained largely dominated by five French companies, which extended the plantations to around 30,000 ha. By the end of 1966, the rubber sector consisted of five state-run plantations, 14 public limited companies, a semi-public company and 2,088 individual planters, covering 62,211 ha (CEDAC 2005).

Between 1970 and 1979, rubber production in Cambodia declined significantly due to the expanding conflict between North Vietnam and United States backed Government of South Vietnam along the Cambodian-Vietnamese border and the subsequent takeover by the Khmer Rouge (1975-1979) resulting in

considerable devastation of the rubber plantations. Cambodia was under Vietnamese occupation between 1979 and 1989 during which time the industry started to revive. Rubber plantations were reorganized in the 1990s into seven state-owned companies, together with two private plantations and several smallholder rubber plantations. As of 2009, total rubber plantation area was 107,901 ha (ANRPC 2009) largely dominated by the seven previously state-run plantations which had been privatized (48 per cent), followed by smallholders (44 per cent), small private companies (6 per cent) and plantations of economic land concessions (2 per cent). In 2007, the total number of workers on rubber estates reached 13,289, of whom 88 per cent were working for the seven large plantations (Ministry of Agriculture, Forestry and Fisheries 2008).

Over the past decade the Royal Government of Cambodia has drafted a new Land Law, Forest Law, and Community Forestry Sub-Decree to insure more equitable and sustainable use of its natural resources and to protect the rights of small holders and ethnic minorities to access land and forest resources. Unfortunately, due to a lack of financial and human resources and constrained by competing policy and political agendas, like in the case of Laos, these land policies and legislation have not been effectively implemented. As a consequence, illegal land purchases and the leasing of large economic concessions are increasing rapidly, often facilitated by local government officials in exchange for commissions.

Fox et al. (2008) studied the transition from swidden farming to commercial crops (cashews and rubber) in Ratanakiri Province between 1989 and 2008. They found that the landscape of Ratanakiri was transformed as secondary forests were cleared at an annual rate of 5% and that traditional communities have lost nearly 40% of their forests over the past 16 years. In one village, Tuy, community members estimated that nearly 80% of households had already sold their land to migrants and investors planting rubber and cashews. In another village, Leu Khun, the study found that with weak support from an NGO and guidance on issues of land management few people had succumbed to selling their land, but that as a whole the community was ill-equipped to block land sales, to address issues of land grabbing, or to fight claims on their land from neighboring villages. In a third village, Krala, the study found that an effective land-use planning process initiated by an activist NGO, enabled villagers to resist outside entrepreneurs and to retain their forests for continued swidden as well as planting cashews on their own land.

Fox et al. (2008) observed that the shift from subsistence to commercial agriculture created a new source of income for many indigenous families, while at the same time stimulated land markets and accelerated land alienation. At the present time, many villages in Cambodia are like Leu Khun, struggling to maintain control over their community lands and forests in the face of growing pressures. The study concluded that a key variable is the extent to which these communities received support from outside agencies including both NGOs and government programs, and received some protection from illegal land speculators. The study also showed that long term, sustained community building is a key to success in establishing viable community institutions that can guide land-use and tenure policy making.

Myanmar

Rubber was introduced into Myanmar in the late 1800s and gradually reached an area of 87,000 ha by 1970-71.⁷ The 1962 coup d'état led by General Ne Win established a socialist military government that expropriated private businesses and followed a policy of economic isolation. Under this regime, which lasted until 1988, private sector rubber planters declined to invest in planting or replanting rubber for fear of nationalization and a lack of financial incentives. By 1990 the area of rubber had dropped to 77,000 ha.

⁷ Rubber statistics for Myanmar were taken from Hla Myint (2008)

After a change in governments in 1988, market-oriented economic policies were adopted. These policies granted rubber planters, both individuals and private companies, rights to lease 2,025 ha of land for 30 years with the possibility of further extension if necessary. Foreign entrepreneurs are now allowed to invest in production, processing, and marketing of rubber. Forest investors can own 100% of the operation or invest in a joint-venture with a Myanmar partner. In all joint-ventures, the minimum share of foreign capital is 35% of the total equity capital, and the minimum amount of foreign capital to be invested is US \$500,000. As an incentive, investors are exempted from paying land rents for eight years, and from paying income taxes for three consecutive years after the commencement of commercial production. The new market-oriented policies worked so well that the area of rubber increased to 225,800 ha by 2005-2006. After the government totally liberalized rubber exports (2004-2005) rubber planting areas boomed reaching 380,000 ha by 2007-08.

Today the private sector dominates the rubber industry in Myanmar constituting 94% of the total planted area and 94 per cent of the total production (2006-2007). According to Hla Myint (2008) 90.5% of rubber holders in Myanmar are smallholders with less than 8 ha; these small holders control approximately 42% of the rubber area. Growers with 8 to 40 ha make up 8.5% of the rubber holders and control 23.3% of the rubber growing area. The remaining 1% of growers with more than 40 ha controls 21% of the land.

In the non-traditional rubber growing areas, however, a different narrative is playing out. A recent article (Undercurrents 2009), for example, tells the story of a southern commander in the United Was State Army (UWSA) who employed Lahu villagers to plant rubber seedlings on their own lands. The commander provided the rubber seedlings and paid 3 Thai Baht per tree planted. Villagers maintain the plantations and protect the trees from fire and animals. The commander has said that when the trees produce, he will give 30% of the profit to the landowner. As in Cambodia and Laos, however, farmers in non-traditional rubber growing areas of Myanmar have been forcibly relocated for rubber plantations, employed by armed groups to establish tracts of rubber, and coerced into planting rubber themselves due to land-use restrictions. While some remain hopeful that once the rubber trees start producing they will enjoy substantial earnings, the lack of security for ordinary farmers, particularly in non-traditional rubber, growing areas remains a looming issue.

Most of the non-traditional rubber plantations in Myanmar are established as joint projects between Myanmar military officials (namely regional military commanders) and Chinese companies with Myanmar companies acting as cover so that Chinese investors can escape paying the high tax on 100% owned foreign companies (Woods 2011). The Myanmar companies cooperating with Chinese businessmen are nearly all local ethnic families with good relations with local and/or national military authorities.

Discussion and conclusion

There is a growing demand and market for natural rubber. In the uplands of mainland Southeast Asia that demand will continue to drive a transition from traditional farming systems and their associated secondary vegetation to a landscape dominated by cash crops, most importantly, rubber. The impact of rubber on smallholders, however, is not yet clear.

Looking more broadly at agrarian transitions Henry Bernstein (2002) holds that under neo-liberal policies and globalization neither land nor labor is secure for rural people across the developing world; he argues that the long-term outcome of the capitalization of agriculture is the polarization of the countryside into capitalist farmers and landless laborers. Li (2007) likewise writes that the state policy interventions necessary to set the conditions for growth simultaneously set the conditions for some sections of the

population to be dispossessed. Winners and losers do not emerge naturally through the magic of the market, they are selected. Alternatively Jonathan Rigg (2001, 2005, and 2006) argues that capitalist farming can stimulate small-scale entrepreneurship and socioeconomic differentiation, with the attendant persistence of small family farms. Rigg points to the growing importance of non-farm activities in farmers' income portfolios; increased mobility between rural and urban activities; the heightened salience of global labor markets and remittances to rural incomes; and a general increase in incomes across the spectrum of farmers from rich to poor (Rigg 2001, 2006). Rigg also argues that access to land, once thought central to farmers' wellbeing, is decreasing in importance to rural livelihoods (Rigg, 2006).

In the transition between traditional farming and commercial rubber production in non-traditional rubber growing areas of mainland Southeast Asia we see both the pessimistic scenario of Bernstein and Li as well as the more optimistic scenario of Rigg playing out.

The largest rubber producing countries in the world (Thailand, Vietnam, Indonesia, Malaysia and India) have all made conscious institutional decisions to support smallholder rubber production. The reasons for this vary but are linked to on-going land reform policies in the different countries, interest from smallholders in establishing rubber, and the inability of governments' to control large estates. Drawing upon the experiences of Xishuangbanna and northeast Thailand it is clear that smallholder rubber production is a viable and effective proposition in moving households and communities out of poverty. As these two examples show swidden farmers can manage access to and use of their lands, given appropriate support (e.g. recognition of long-term use rights, and provided with extension services and subsidies during the initial period when rubber is being planted and becoming productive. On the other hand, externally imposed, large-scale policies (such as the commercial estates being established in Laos, Cambodia, and Myanmar) affect smallholders adversely. Even when laws and ordinances have been drafted that could assist smallholders to maintain control of their land and invest in commercial crops, lack of financial and human resources and competing policy and political agendas have prevented these measures from being implemented effectively. Consequently in many communities villagers are selling their land and migrants are moving into the areas. In other communities farmers are struggling to maintain community lands and forests in the face of growing pressures from investors and government institutions to impose concession arrangements.

In order to promote the establishment of a vibrant smallholder rubber sector the state needs to establish and effectively implement national policies and institutional structures to support smallholder rubber cultivators (Table 2). National legislation needs to be developed that recognizes customary claims to swidden fallows and grants farmers and farming communities legal access to the land they have traditionally used through either secure tenure or long-term use rights. In addition to access rights, national agencies need to support smallholders through integrate efforts to provide extension, credit, transport and marketing facilities such as that provided by the Offices of Rubber Replanting Aid Fund (ORRAF) in Thailand. It may also be useful to establish a governing and coordinating body to work closely with all sectors related to the rubber industry. At the local level, smallholder farmer groups need to be organized and/or supported in order to strengthen rubber cultivation, tapping, processing and marketing. These institutional arrangements need to be considered by policymakers as an imperative to support the sustainability and economic viability of smallholders' rubber production.

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