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Forest transitions in Southeast Asia: Synergies and shortcomings in land-change science and political ecology

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Introduction

In their inspiring review of convergences and divergences in land-change science (LCS) and political ecology (PE), B. L. Turner II and Paul Robbins proposed that the two schools of thought achieve consensus on forest transitions and suggested that PE and LCS "may work together in productive hybrid ways" (2008, p308) to improve understanding of human-environment interactions and potentially enhance the outcomes of development interventions. In this chapter, we attempt to engage critically with these observations and propositions by reflecting on forest transitions in Asia and, in particular, Vietnam and China. We discuss some of the key domains of convergence and divergence between PE and LCS with regard to the advancement of forest transition theory, the socio-political and ecological impacts of forest transitions, and the conceptual and practical propositions put forward by researchers to address land-use displacement (leakages) issues. From there, we introduce the case of Laos. We show how deforestation leakages from China and Vietnam to Laos are magnified by new political-economic arrangements and changing scales of land and forest governance. On this basis, we argue that actor-networks may constitute important nexuses for synergy between PE and LCS research, provide critical insights into the complex arrangements of actors and scales involved in deforestation-reforestation dynamics, and allow for a better targeting of proposed interventions.

Forest transitions in Vietnam and China

Consensus

Vietnam and China are among the few countries of the global South that have recently experienced forest transitions from net deforestation to net reforestation. As described by Mather (2007), these transitions occurred in the 1980s in China and during the 1990s in Vietnam. In both countries, forest expansion appears to have been sustained since then, with total forest cover increasing from 16.8 percent to 21.2 percent and 28.7 percent to 39.7 percent in China and Vietnam respectively between 1990 and 2005 (FAO, 2006). Applied in these countries, LCS and PE research raises important and complementary questions for forest transition theory. First, this research suggest that there may be other, more complex pathways leading to forest transitions than the "labour scarcity–reforestation" and "forest

scarcity–afforestation" pathways described by Rudel et al (2005). For scholars like Sowerwine (2004) and Castella et al (2006), reforestation patterns in Vietnam can hardly be attributed exclusively to reforestation policies or the emergence of off-farm opportunities. In a case study in Hoa Binh province, Clément and Amezaga (2008, 2009) highlighted how village-state relations and the disruption of local institutions by forest policies, rather than policy itself, have played key roles in propelling reforestation. In another study in northern Vietnam, Sikor (2001) documented how reforestation was the unintended and locally-specific outcome of access to new agricultural markets, technological innovations, agricultural intensification, and the resistance of farmers to state policies. In line with these findings, Meyfroidt and Lambin (2008a) proposed a third forest transition pathway that would better correspond to the situation of Vietnam: a "smallholder agricultural intensification" path whereby smallholder agriculture concentrates on the most productive and accessible land leading to a gradual reforestation of hillsides. This occurred after a short period of rapid deforestation at the end of the 1980s because of unclear land rights (Castella et al, 2005).

Analyzing forest transitions in Vietnam and China, PE and LCS studies highlight the fact that much of what is considered as reforestation in these countries is in fact made up of cultivated tree monocultures. China has the largest area of planted forests in the world resulting from massive investments in reforestation by national compensation programs that are enforced by national agencies and implemented by smallholders, as described by Lang (2002) and Xu et al (2007). In 2005, 54 out of 71 million hectares of reforested land were composed of so-called "economic forests", in particular, *Cunninghamia*, pine, and rubber plantations. Similarly, studies of historical land-use and land-cover changes in Vietnam by Meyfroidt and Lambin (2008a, 2008b) showed that recent reforestation rates were due, in similar proportions, to natural forest regrowth and the expansion of tree plantations. In 2005, 8 percent out of a total forest cover of 39 percent was composed of plantations of fast-growing species such as acacia and eucalyptus.

Practitioners of LCS and PE adopt fairly different stances when addressing these issues. Land-change scientists adopt a somewhat neutral perspective, focusing mainly on the identification, weighting and modeling of the conditions and drivers for forest-cover change. Political ecologists put forward a more critical view of the forest transitions observed, emphasizing the continuing degradation of natural forests and unraveling the political-economic strategies, environmental narratives, and power struggles that underlie forest conservation and afforestation. Notwithstanding these distinctions, both approaches suggest that the kinds of forest transitions experienced in Vietnam and China come with important socio-political and ecological issues. In Vietnam, persistent dynamics of natural forest degradation, natural habitat fragmentation and increased socioeconomic inequalities have been reported (Sowerwine, 2004; Clement and Amezaga, 2008; Meyfroidtand Lambin, 2008a). In China, the forest transition has been accompanied by negative impacts on soil and water cycles, increased smallholder vulnerability, growing rural-urban inequalities and the

marginalization of forest-dwelling minorities (Muldavin, 2000; Lang, 2002; Blaikie and Muldavin, 2004; Xu et al, 2005, 2007; Yeh, 2009).

Shortcomings

Of particular interest for this discussion of the synergies and shortcomings of LCS and PE, studies from the two disciplines also highlight land-use displacements or leakages abroad that, if accounted for, offset a significant share of the net reforestation in China and Vietnam (Lang and Chan, 2006; Meyfroidt and Lambin, 2009; Meyfroidt et al, 2010). In this regard, much of the debate in LCS focuses on the methodological and theoretical implications of leakages, such as analyzing the role of scale and/or drivers operating at different scales in defining forest transitions (Pfaff and Walker, 2010; Walker, 2012). Recently, approaches to teleconnections have also gained increasing momentum in LCS (Reenberg and Fenger, 2011), reflecting efforts to gain a better understanding of cause-and-effect linkages between distant and apparently unconnected places, socioeconomic and land-use dynamics. Thus, LCS research puts a strong emphasis on modelling forest transition at different scales, such as aggregate versus regional, and the flows of capital, goods, population and information across places and their impacts on deforestation-reforestation dynamics. While LCS can provide powerful models for exploring global or transnational connections across socioeconomic, policy, and ecological spheres, it falls short of convincing propositions when attempting to identify options for controlling deforestation leakages. With an explicit attention to global commodity networks and building upon concepts from neoliberal economics, the main propositions seek to address leakage issues through initiatives such as "eco-consumerism" and "new corporate environmentalism" (Meyfroidt and Lambin, 2011). These initiatives run the risk of being overly ambitious as they require coordination and change *at the global scale*, across public (governments, NGOs, researchers) and private (industries, consumers) sectors (Dauvergne and Lister, 2010). This option is especially likely to require considerable effort, leadership, and time in major wood consuming countries like China where the demand for green products is virtually non-existent.

Political ecology research puts more emphasis on the politics, socio-economic determinants and impacts of local and regional deforestation-reforestation dynamics (Rocheleau et al, 2001; Hecht, 2012). It generally does so through a grounded approach contextualizing, from the local up to the global scale, land-use and forest cover changes and interrelations with political-economic dynamics. With this bottom-up critical perspective, PE can provide valuable insights on the heterogeneity and complexity underlying forest transitions in various parts of the world (Robbins and Fraser, 2003). However, heterogeneity and complexity constitute, in turn, significant challenges for addressing leakage issues. As highlighted by Brown and Purcell (2005) for instance, many PE studies fail to engage with the politics of scale and scalar arrangements that govern the connections between local and transnational processes. They remain entangled in a "local trap" and tend to assume that activities organized at the local scale are inherently more likely to yield positive results. Yet,

some valuable options may lie at other scales or emerge from new scalar arrangements in environmental governance. To overcome these limitations, PE researchers have in recent years started developing network approaches (e.g., Birkenholtz, 2012; Rocheleau, 2012). Inspired by actor-network theory (ANT), these approaches aim at bridging long standing conceptual divides (global-local, society-nature and state-society) while making sense of complexity and heterogeneity by illuminating connections between local and transnational social-ecological change. They do so by conceptualizing actor-networks as polycentric assemblages of human actors, with their respective standpoints, and non-human actors (e.g., other living beings and their habitats, technologies, and artifacts), all tied to a composite territory that connects multiple places.

These conceptual developments can provide powerful tools for approaching land-use displacements and deforestation leakages, and may highlight novel approaches to addressing these issues. In the next section, we show that leakages are rooted in particular places, but that they are also a manifestation of actor networks that operate across scales, at a transnational level. Thus, to understand the functioning of leakages, one needs to understand the structure and functioning of transnational actor networks where power relations are created, sustained and resisted through the convergence of political and economic interests and the production and circulation of knowledge. To illustrate our point, we analyze the recent history of land and forest governance in Laos and attempt to connect it with forest policy and transitions in Vietnam and China.

Land-use displacement in Laos

State territorialization and land and forest governance in Laos

Increased state control over land and natural resources has constituted, over the past three decades, a core objective of government policy in Laos (Lestrelin, 2010). Since 1975, the immediate post-Indochina War period, state territorialization efforts have translated into the resettlement of remote populations in more accessible areas, along roads and rivers. Although initial relocation programs were essentially aimed at securing national territory and increasing political control over potentially subversive populations, the strategy persisted over time as a means to facilitate the delivery of state services, increase the access of rural populations to markets, and eradicate subsistence-oriented shifting cultivation deemed unproductive and environmentally destructive by the central government (Baird and Shoemaker, 2007). Although there are no precise national figures on the extent of resettlements, some scholars suggest that, in some northern mountainous provinces, more than half of the entire population could have been displaced between 1975 and 1990 (Evrard and Goudineau, 2004).

Similar to the land reforms implemented in China in the 1980s ("Household Responsibility System") and later in Vietnam (*Doi Moi*), village land-use planning and land allocation (LUPLA) also became a major instrument of state territorialization in the 1990s (Lestrelin et

al, 2012). Various reports have highlighted a strong tendency among land-use planners to favour forest over agricultural land during village zoning efforts (e.g., Evrard, 2004; Ducourtieux et al, 2005). Between 1995 and 2005, the LUPLA program was implemented in 7,130 villages and led to 61 percent of land (6.6 million ha) being classified as protection, conservation and production forests under the authority of the district forestry administration. The remaining 39 percent was classified as agricultural land and allocated to individual households (GoL, 2009). A "3-plot per household" policy was also implemented for the purpose of forcing smallholders to abandon shifting cultivation. As farmers could not maintain a productive shifting cultivation system under these constraints, they were expected to intensify their cropping systems toward permanent crops with the support of extension services that would provide improved technologies for increasing land productivity (e.g., improved seed varieties, fertilizers, pesticides). Yet, subject to an enduring lack of financial and human capacity, the state could not deliver the expected technologies and many farmers became poorer as they still employed a shifting cultivation system but with less land to do so.

At the same time than LUPLA was implemented, the government also demarcated large areas of state forests. As per the Lao legislation, forests are constituted by all plots of land, regardless of existing tree cover, defined as such by the state. The forestry law differentiates three main categories of state forests: conservation (*pa sa-ngouan*), protection (*pa pongkanh*) and production (*pa phalit*). About 12.5 million ha of state production, conservation and protection forests (53 percent of the national territory) had been delineated by 2011. The government is now seeking to expand the area of protection forests from 6 to 8.2 million ha by 2015, and it has set the ambitious policy goal of reaching 70 percent of national forest cover by 2020.

Gradual disconnection of rural livelihoods from forest lands and resources has resulted from resettlements, policies encouraging agricultural intensification, and the demarcation of state forests (Castella et al, 2012). Rural communities have been moved away from the dense forests subsequently classified as state forests and gathered in locations with high population density where shifting cultivation practices are rendered unsustainable by shortened fallow periods and where existing forestlands have been rapidly degraded. Until the mid-1990s, this segregation process provided significant room for manoeuver for military-supported logging companies to exploit timber resources in state forests and engage in relatively straightforward trade agreements with buyers from Asian countries like Vietnam, Thailand, Taiwan and Malaysia (Lang 2001) (see Figure 1). The creation of a network of National Protected Areas (around 3 million ha) in the early 1990s had little effect on timber extraction rates as the government lacked the resources to enforce land regulations and the management of protected areas (often located in remote border areas) was entrusted to the army whose main income was generated through logging.

The late 1990s–early 2000s marked an important shift in land and forest governance. Confronted by an enduring lack of financial and human resources and following neo-liberal models advocated by donors like the World Bank and the Asian Development Bank, "turning land into capital" became a key strategy for national development (Lestrelin et al, 2012). Donors expected that facilitating private land investment, granting land concessions, and promoting contract farming arrangements would encourage the private sector to provide innovative technologies and the capital needed to support the modernization and intensification of rural land-uses. Although the policy shift proved an efficient strategy for attracting foreign capital, it had much more ambiguous effects on land and forest governance and rural land development.

Figure 1 *Logs on their way to Vietnam in Khamkeut District, Bolikhamxay Province, Laos (Source: JC Castella, February 2009)*

Emergence of powerful transnational networks

A growing number of studies have drawn attention to the impacts of Vietnam's and China's market demands and land investments on forest conversion and logging in Laos (EIA and Telapak, 2008; Baird, 2010a, 2011; Forest Trends, 2010; Barney and Canby, 2011; EIA, 2011, 2012). While official data from the Lao authorities are generally considered unreliable, mirror data from neighbouring countries suggest that Lao timber exports have remained steady since the early 2000s in spite of successive logging and log export bans in 1999, 2000,

2001 and 2004 (Figure 2). Throughout the 2000s, opaque negotiations at the central level have resulted in a substantial number of logging concessions approved on state and village lands, such as reservoir areas of proposed hydroelectric dams, even though logging activities in Laos are normally only allowed in state production forests and require approval through quotas from the National Assembly (Baird 2010b; Barney and Canby 2011).

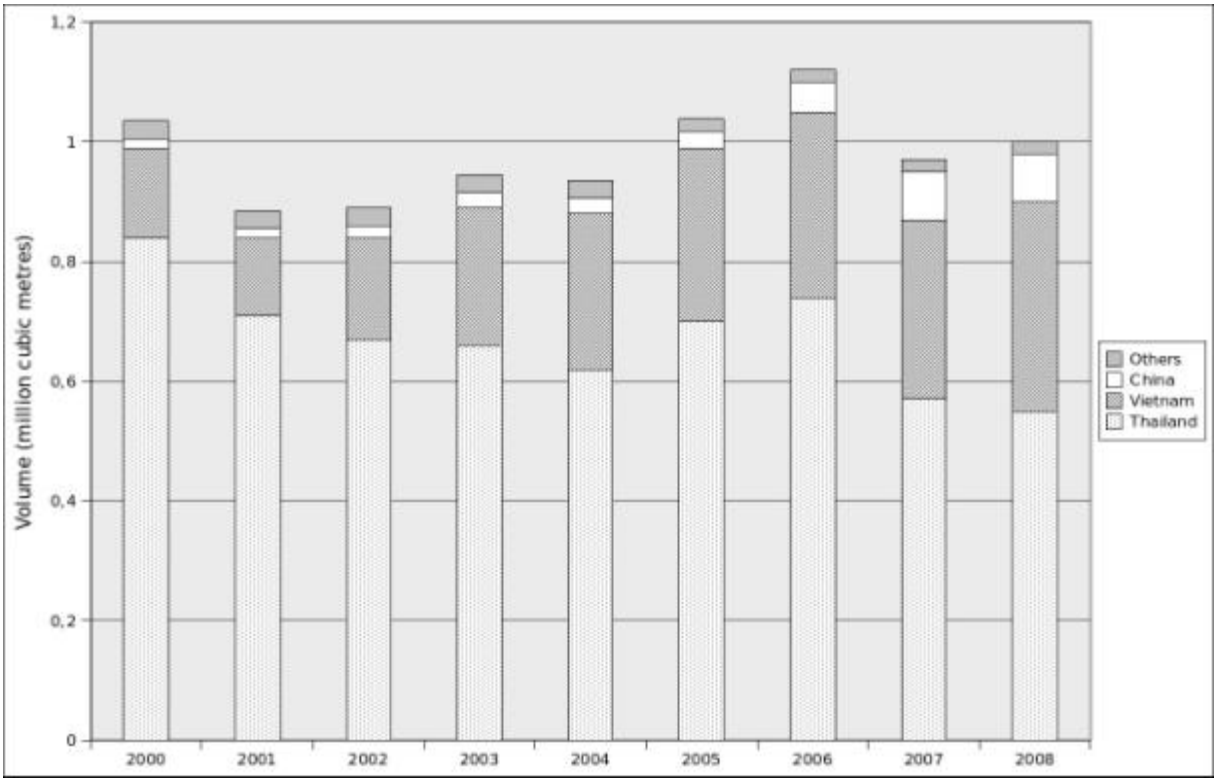

Figure 2 *Destination of Lao timber product exports, by country (Source: Barney and Canby, 2011)*

Although the exact extent of land concessions at the national-level is unknown, the Lao Ministry of Agriculture and Forestry estimates that the area conceded to agribusiness and plantation companies amounted to 1.5 million ha in 2010 (GoL, 2010). Arguing that China alone is demanding 1 million ha for food production in Laos, Schoenweger and Üllenberg (2009) estimate that figures of 2-3 million ha, or 10-15 percent of the national territory, are probably closer to the reality. However, only 500,000 ha of these concessions would already be planted and much less area would be at the production stage. In fact, land deals and timber exports are strongly correlated in Laos. There is ample evidence that industrial tree plantations are often established on forested land (Nanthavong et al, 2009; Barney, 2011). Moreover, conversion land has been the main source of timber exports since the early 2000s and numerous cases have been reported of concessionaires harvesting the timber from the land they have been allocated for development before selling the lease rights to a third party (Barney and Canby, 2011).

The recent process of land and forest governance in Laos has facilitated massive and uncontrolled land deals, forest conversion, and timber extraction. In particular, the policy and legal reforms adopted in the late 1990s by the Lao government for easing private land

investments coincided with a booming demand for timber and land for commercial plantations from neighboring countries – especially China and Vietnam.

With the start of economic reforms in 1978, China's forestry sector was caught up in a whirlwind of change (Wang et al, 2004). It began with the devolution of forest tenure to smallholders in rural areas, but led to reform of state-owned forest enterprises via introduction of stumpage fees and liberalized forest product prices. In the wake of the 1998 floods in the Yangtze River Basin, there was a shift in focus from timber production to environmental protection, with policy redirected toward the rehabilitation of damaged forest ecosystems, afforestation in dry and degraded areas, and a ban on logging in natural forests. Combined with the logging ban, land-based capital accumulation and rapid economic growth engendered increased competition for access to national land and forest resources; this resulted in many forestry and wood-processing companies relocating their activities and/or looking for supply sources abroad (Lin, 2009). This move was supported by the central government's so-called "Go Out" (*zouchuqu*) strategy which, at the end of the 1990s, started pushing Chinese companies to invest abroad (Mann, 2009).

Internal political, socioeconomic and land-use processes have driven dramatic changes in wood production and trade in Vietnam over the last 20 years (Meyfroidt et al, 2010). Throughout the 1990s, the government of Vietnam shifted the source of wood from natural forests toward plantations and imports, and shifted exports from raw wood towards value-added processed wood. In 1993, legal reforms were enacted that enabled the devolution of forest tenure in rural areas, and a logging ban was implemented in select areas of the country. In 1998, the ban was extended to include 58 percent of the nation's natural forests. Despite illegal logging, the domestic supply of wood was insufficient to feed the growing need of the wood processing industry, and wood was increasingly supplied by imports (both legal and illegal) from neighbouring countries – especially Laos and Cambodia (EIA, 2011, 2012).

Two processes have propelled the emergence and expansion of transnational networks involving powerful Chinese and Vietnamese investors (private and public) and high-ranking Lao government officials or their relatives and allies. On the one hand, the convergence between a pressing market demand from Vietnam and China's forestry and wood processing sectors and, on the other hand, the Lao government's strong need for finances, in the context of strongly centralized land and forest governance. In many instances, these networks materialize through the establishment of joint ventures. Their *modus operandi* often involves unofficial negotiations at higher levels of government and the financing of development interventions by private and/or public organizations in exchange for the granting of land concessions by the Lao government. Thus, many large scale land deals concluded since the early 2000s have involved an outsourcing and partial privatization of development interventions (Dwyer, 2011).

In northern Laos, for instance, several Chinese rubber companies have expanded their operations in Laos under a program subsidized by the Chinese government to alleviate opium poppy cultivation (see Figure 3 below). This move was part of the "Go Out" strategy that made recently privatized state rubber farms from Yunnan eligible for tax exemptions on imported rubber, and for up to 80 percent subsidies on their establishment costs abroad (Mann, 2009). Shi (2008) and Tan (2012) described the cases of the Yunnan State Farms group (a former state and now semi-private rubber enterprise) and the China-Lao Ruifeng Rubber Company (a state-owned company originally specializing in entertainment) which obtained 170,000 ha and 300,000ha respectively of concession and concession-type contract farming schemes in Luang Namtha Province through joint ventures with the Lao military and/or veiled business arrangements with high-ranking Lao officials. As described by the above researchers, the granting of these concessions was negotiated along with several bilateral cooperation agreements during visits of China's Vice Premier Wu Yi and Premier Wen Jiabao to Laos in 2004.

Figure 3 *Chinese rubber concession in Nalae District, Luang Namtha Province, Laos (Source: JC Castella, June 2008).* The photo shows young rubber trees (*Hevea brasiliensis*) in the foreground. The sign in the background indicates that the plantation is supported by a bilateral Lao-Chinese cooperation program for the replacement of opium poppy cultivation.

Similarly, in southern Laos, Vietnamese companies supported by high-ranking military officials were allocated large logging concessions as part of agreements negotiated at the

highest levels (EIA, 2012). According to different reports, some of these concessions could be considered as a tribute paid by the Lao government to Vietnam for military support during the Indochina Wars (Lang, 2001; Baird and Le Billon, 2012). Thus, the military connections play an important part in deforestation dynamics and timber exports (both legal and illegal) along the Vietnam border (Forest Trends, 2010; Baird, 2010b). Yet, as with Chinese investments in the north, the process often goes beyond simple commercial deals between Lao officials and Vietnamese investors and buyers. In a case study in Attapeu Province, Kenney-Lazar (2012) describes how, in 2008 the HAGL Joint Stock Company (a private Vietnamese corporation involved in timber and real estate sectors) was able to obtain a 35-year 10,000 ha rubber concession in return for helping to finance the 2009 Southeast Asian Games hosted in Laos. Although the contract stipulated that the concession would be limited to state land, provincial and district officials implementing LUPLA assisted HAGL's logging and plantation activities on the lands of several villages. The mediation of the provincial and district administration and the promise made by HAGL to fund village-level infrastructure development – such as electric lines, roads and bridges, schools and health centres – managed to avoid major conflicts, although land dispossessions met with some opposition at the local level.

The above case studies reveal the complexities and specificities of land acquisition and deforestation processes in Laos. Placed in a broader political-economic context, they highlight how powerful Chinese and Vietnamese companies have responded to national land and forest policies by developing complex transnational networks involving Chinese, Vietnamese and Lao political elites and relocating part of their sourcing, investment and production activities in Laos. Since the early 2000s, these networks have constituted a primary driver for land conversion and deforestation in Laos. Paradoxically, they have also constituted important sources of financial support for rural and infrastructure development in a country marked by an enduring lack of finances. In fact, the potency of networks might be more related to the mutual benefits received by the different parties involved (Dwyer, 2011) although collusion, patron-client relations, and corruption certainly play important roles in network functioning maintenance, and expansion (Baird, 2011). Through these networks, Chinese and Vietnamese political elites push the interest of key economic actors (and limit pressure on domestic resources), foreign investors and buyers secure interesting deals on land and forest resources, and the Lao government receives financial support to implement its policies, advances toward its objective of facilitating access to state services and markets in rural areas, and thus reinforces its legitimacy.

Knowledge production

An emergent property of these transnational public-private networks is a capacity to frame knowledge, practices and perhaps even policies related to land and forest resources management. In particular, the Lao government's enduring efforts at demarcating and expanding national forestlands could be partly related to the creation of conditions

favourable to the exploitation of land and forest resources by transnational commercial networks (Barney, 2008). In many of the land deals mentioned above, large tracts of forests have been logged and replaced by industrial tree plantations (allowing for a rapid return on land investment). Yet, the Lao forestry law establishes that only "barren forestland" and "degraded forestland" can be allocated as concessions for tree plantations. The notion of "degraded forestland" introduces enough ambiguity for forest conversions to happen lawfully outside designated areas. While it is legally defined as land where forest will not regenerate naturally, "degraded forestland" has long been considered by land-use planners (in line with the policy goal of eradicating shifting cultivation) as the outcome of shifting cultivation practices and, ironically, constituted by fallow land at different stages of forest regrowth. As described by Shi (2008) in northern Laos, secondary forests that were part of long term rotational agricultural systems are often reclassified as "degraded forest", hence allowing for the transfer of village forestlands to investors. In turn, once logged and converted into tree monoculture plantations, many land concessions remain classified as forestlands, thus hiding the reality of deforestation or, at least, buffering its extent.

As pointed out by various scholars, efforts at identifying ''empty'' space or freeing space for the development of large-scale agribusiness, mining and hydropower concessions transpire also from national-level initiatives like the development of a national land-use master plan (Lestrelin et al, 2012), and the design of two regional, southern and northern, industrial economic development plans supported by China's Yunnan Province and the Asian Development Bank (Shi, 2009). Overall, the absence of reliable spatial data on land tenure and land concessions at the national level and confusing definitions and interpretations of the official land classification (e.g., "degraded forestlands") constitute fertile grounds for manipulating information on land-use and forest cover. A comparison of different forest cover assessments by Heinimann (2006), for instance, highlighted that forest cover figures in Laos can vary by a factor of two while deforestation rates vary by a factor of almost 10. Although part of this variation may be explained by the different methodologies employed, the main factor is generally related to changing land and forest classifications. In particular, the definition and delineation of forestlands represent critical adjustment variables. Put differently, if the national land-use planning project and its 70 percent forest cover objective were to become actual land cover, Laos would experience a forest transition in the near future. However, one might be startled when investigating what actually constitutes that 70 percent forest cover and who has rights to it.

Discussion and conclusions

Beyond unbalanced demand-and-supply equations and the offshoring of deforestation in Laos, we see leakages as a result of new political-economic arrangements and changing scales of land and forest governance. Land and forest tenure reforms and national logging bans introduced in China and Vietnam in the 1980s and 1990s pushed powerful forestry and wood-processing companies to go transnational. Simultaneously in Laos, market integration

without devolution of forest tenure favoured trans-border alliances between political and economic elites. In many cases, foreign investors and buyers have been able to build upon long-standing political or military ties between neighbouring countries. More generally, large scale land investments have been facilitated by the Lao government's strong need for financial capital and emerging opportunities for privatizing rural and infrastructure development. The emergence of powerful transnational and hybrid (public-private) networks has engendered important shifts in scales of land and forest governance (Barney, 2009). In turn, these networks provide significant room for collusion, large-scale land and forest resources grabs, dissimulation of illegal practices along the commodity chains, and/or circumvention of the local, national and international regulations.

In more conceptual terms, the deforestation leakages explained above can be described as a manifestation of transnational actor-networks linking capital accumulation and reforestation in Vietnam and China with large scale land grabbing, deforestation and targeted development interventions in Laos. These networks involve complex and potentially changing arrangements of human actors, such as Lao and foreign government officials operating at different scales, public and private enterprises, local communities, and foreign workers, among others. Their potency is linked to their ability to produce knowledge on land and forest tenure and cover in Laos, shape land management practices, fund rural and infrastructure development and, thus, support territorialization of the Lao State.

Obviously, analyzing deforestation leakages through the lens of actor-networks does not provide ready-made or universal solutions. In the case of Laos however, it suggests that alternatives to the outsourcing and privatization of development interventions may assist in controlling deforestation. Ironically, such alternatives might be partly modelled from the very countries responsible for large land and forest resources grabs in Laos. Analyzing Vietnam's plantation sector, Sikor (2012) described how new scalar arrangements in forestland governance contributed to forest preservation and reforestation. In particular, he showd how central government policies, which provided both resource (forestland allocation) and economic entitlements (credit for plantations) to rural households, facilitated the expansion of smallholder tree plantations and limited dramatically the potential for large-scale land acquisitions. Combined with a logging ban on state forests, these policies had significant consequences for the profitability of smallholder fast-growing tree plantations and were a key driver of Vietnam's forest transition. Departing from a simple devolution of forest tenure, the process contributed also to the territorialization of the Vietnamese State as it positioned the latter as the ultimate authority for defining land and land-use rights, settling land disputes, and supporting the emergence of new economic activities. Now, whether Laos could undertake a similar scalar reconfiguration in forest governance is very much dependent on the readiness of its political leaders and the resources available, or made available, to them.

Going back to the two approaches discussed by Turner and Robbins (2008), our analysis suggests that recent PE approaches are probably better equipped conceptually for analyzing leakage issues and highlighting ways to address them. Network approaches in PE allow for addressing not only the "why" – the political-economic and ecological conditions and disparities that explain displacements of land-use and flows of resources and people from one place to another – but also the "how" of leakages – the various actors and socio-political relations involved in the functioning and reproduction of leakages. This attention to actor-networks allows for moving beyond LCS's propositions and looking across scales, *in between* the consumer–producer relations. From there, actor-network approaches can help reflection on the opportunities for, and potential effects of, scalar reconfigurations in resource governance.

Regarding potential synergies, a PE-like approach to actor-networks could support LCS engagement with the politics of leakages, thus providing some room for both macro and micro perspectives in research on land-use transitions and teleconnections. A more critical approach to land classifications as socio-political constructs (e.g., the "degraded forests" of Laos) may also constitute an area where synergies between PE and LCS research could yield valuable results. Meso- or regional level approaches to land-use and land cover change could be more sensitive to the genealogy of land classifications and, especially, the relations between particular land classes, actors and their political-economic and territorial agendas. They could help to unravel and map power relations within and across different national contexts, thus making more transparent the socio-political drivers and implications of land-use transitions.

Finally, alongside research on the *drivers* and *scales* of deforestation and reforestation and how they are shaped by flows of commodities, capital, people and information – "traditional" subjects of inquiry for LCS – we argue for an additional focus on the *actors* of deforestation and reforestation and their relative configurations as targets for intervention. In line with the objectives of sustainability science, this kind of research could contribute to advance our understanding of complex socio-environmental issues such as land-use displacements and deforestation leakages, provide stakeholders (e.g., policy makers, donors, civil society) with practical information on cause-and-effect linkages and potential avenues for resolving issues, and perhaps achieve greater impact.

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