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ARTICLE



Teak plantation smallholders in Lao PDR: what influences compliance with plantation regulations?

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ABSTRACT

Past policies to promote the planting of trees by smallholders have been effective in Lao PDR. In Luang Prabang Province over 15 000 ha of teak (*Tectona grandis*) have been established. New policies to stop illegal logging, promote timber legality of wood exports and encourage domestic wood processing aim to mobilise this teak resource as an alternative to timber from natural forests. Several factors are thought to inhibit smallholder participation in the timber value chain and this risks their exclusion from international markets. These factors include the hidden nature of their teak plantation resource, inability to comply with complex regulations and limited capacity to engage with markets. This paper explores the policy and regulatory environment for smallholder plantation teak to understand how instrumental and normative factors may influence compliance with plantation regulations and affect participation in new governance structures such as grower groups. The results emphasise the need for policies, regulations and governance to take into account the human factor if value chains that depend on smallholder plantations are to be effective.

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Introduction

Policies to promote smallholder plantations have been implemented in many parts of the developing world. Anticipated outcomes have been poverty alleviation, the promotion of individual property rights, land markets, restoration of degraded lands, increasing or protecting forest cover, reducing illegal logging and a source of timber for domestic processing and international markets. As a result of encouragement by programs for land allocation, access to credit, subsidised plantation inputs, tax incentives and various fee exemptions, many countries now host a substantial smallholder-owned plantation timber resource, which is often unquantified and 'hidden' at the broad scale (Midgley et al. 2017), but which is integrated into the livelihood systems of large numbers of individuals, families and communities (Newby et al. 2012).

International concern over the sustainability and legality of wood from countries such as Lao PDR has prompted new global policies for timber legality and certification which aim to standardise grower practices according to often pre-determined codes and external norms (Kusumawati et al. 2013). National governments have the task of providing the enabling regulatory environment to translate these global norms to the local context. Friction may emerge, however, between standards, national policies and local practice (Tsing 2005) due to the convergence of diverse and sometimes contrasting values. The response is often the introduction of more regulations, creating a complex, sometimes unknown and often un-navigable environment for smallholders.

The ability and willingness of smallholders to comply with rules and meet standards may be influenced by instrumental, normative and contextual factors that are not readily apparent to policy makers. Policies tend to adopt

generalisations so as to be broadly applicable but many of the day-to-day decisions that smallholders make lie beyond the authority or scope of the state; local realities affect the ways in which broader scale plans and governance play out (Colfer 2011). This is the case for smallholder-grown teak in Lao PDR.

Teak (*Tectona grandis*) is a high-value timber species that occurs in natural forests. It was first harvested by the French during the colonial era and during a subsequent period of forest exploitation (Hansen et al. 1997). In 2010 the area of naturally occurring teak was estimated to be around 50 000 ha, a reduction in area by 68 000 ha since 1992 (Kollert & Cherubini 2012). As a consequence, it is recognised today as a 'special species' and attracts specific protection under national legislation. The planting of teak by smallholders has also been promoted in policies since the 1980s in recognition of its high value, its potential to provide opportunities for generation of farm income and to promote permanent production. Anticipated flow-on benefits included increasing forest cover, reducing poverty and providing a source of timber for industry. These policies have been effective and many farmers in northern Laos have integrated teak in their livelihood strategies (Newby et al. 2014). However, the friction between co-existing policies for the protection of teak and its production has resulted in a substantial body of regulations (Smith 2014) which has created instrumental barriers to an effective smallholder teak plantation wood value chain.

The ACIAR project 'Enhancing key elements of the value chain of plantation grown wood in Lao PDR' (FST 2010/012) has been investigating constraints and inefficiencies in the teak plantation value chain that limit returns to smallholder growers. Drawing on an analytical framework for forest law

compliance proposed by Ramcilovic-Suominen and Epstein (2012), this paper explores the policy and regulatory environment for smallholder plantation teak to understand what factors may influence compliance with plantation rules. It firstly summarises general concepts for analysing compliance that are applicable beyond the Lao context. It then describes the method for mapping the smallholder teak plantations, exposing the 'hidden asset' at its most fundamental level. Two key sites of regulation in the value chain, plantation registration and harvesting, are explored through a novel application of systems mapping and value chain concepts. The formation of new networks for resource mobilisation and income-generation purposes, farmer grower groups, is described and their effectiveness as a legitimate institution is discussed. We comment on the effectiveness of international programs for certification and legality.

Concepts for analysing compliance

Ramcilovic-Suominen and Epstein (2012) proposed that one of the main constraints impeding empirical research into compliance in forestry is the absence of a suitable analytical framework. Drawing on theoretical models of individual rule compliance and a review of global studies on illegal forest activities they consider:

- a. instrumental compliance models in which actors are seen as rational individuals weighing up the costs and benefits of compliance, the likelihood and magnitude of gain and the likelihood and severity of sanctions
- b. normative models, which emphasise the role of largely social norms but also individual morals, and which may include concepts such as reciprocity, fairness, legitimacy and cooperation. Individuals adjust their behaviour in response to the observed behaviour of others
- c. legitimacy, in which people's willingness to comply with rules is influenced by their perceptions of the institutions making the rules. The level of acceptance of political, administrative or other authority leads to an obligation to comply with the rules made by that authority. Factors that affect perceptions of legitimacy may include the opportunity to participate in the rule-making process and the consistency of the application of the rules. Legitimacy has normative underpinnings in terms of what is right and fair (Hall et al. 2011) and may result in the creation or perpetuation of legal pluralism (Von Benda-Beckmann 2001).

Their model also recognises the need to consider external contextual factors such as markets.

This study also draws on these concepts to explore those factors that influence smallholders' decisions about compliance with plantation regulations and their participation in new institutional arrangements, grower groups, which are intended to facilitate market access.

Plantation policies in Lao PDR

Plantation policy in Lao PDR has developed in stages (Phimmavong et al. 2009; Kim & Alounsavath 2015), largely in response to broader national strategies that are influenced by global trends. Many of these policy objectives have emerged through the diffusion of policy from

elsewhere and are not unique to Lao PDR: for example it is possible to see convergence with policies in neighbouring countries such as Vietnam (Ohlsson 2009).

Forestry and plantations have been recognised as cross-cutting issues and are viewed as important for both local and macro-level socio-economic development and for addressing key environmental concerns. The effective promotion of plantations to farmers now places thousands of smallholders at the point of convergence of diverse policy objectives with multiple, often contrasting objectives such as increasing forest cover, stabilising shifting cultivation, encouraging permanent cultivation, developing land markets, supporting domestic wood processing, economic development and poverty reduction, amongst others. Some but not all of these are intended to directly benefit smallholders.

Global trends in forest policy have transformed rapidly (Rudel 2008); countries such as Lao PDR operate in a frequently changing policy environment heavily influenced by international standards. New concepts may be introduced in quick succession and the translation of these into instrumental measures by government may create regulatory and institutional complexity and an environment in which a multitude of government agencies assert their legal responsibility to allocate and control access to land, resources, forests and markets. An expansive body of legislation variously enables and constrains national, provincial and district authorities, creating duplicate and sometimes contradictory rules resulting in costly red tape and gridlock in a seemingly unworkable governance environment (Katz 2010). For plantation smallholders this environment may act as a deterrent to compliance (Maryudi et al. 2015) and constrain the value chain for their products.

Smallholder teak plantations

The establishment of smallholder teak plantations has been a long-term objective of forest policy in Lao PDR and was translated into practice through the Land and Forest Allocation Process (LFAP) of the early 1990s. This process facilitated the allocation of land to individuals and households for agriculture and other production, including for tree plantations (Newby et al. 2012). LFAP underpinned broader policies for permanent settlement and resettlement (Lund 2011), for stabilising shifting cultivation in the uplands (Ducourtieux et al. 2005), for village land reallocation (Fujita & Phanvilay 2008), and for improved use of land and the development of land markets (Dwyer 2007).

Through LFAP, the systematic allocation of land-use rights permitted teak plantations to be legally established by households on up to 3 ha of degraded land for each labour unit (productive adult) within a family. A Temporary Land Use Certificate (TLUC) together with a land-use contract was entered into. Households were required to pay land tax for the first three years after planting, after which, if the terms of the contract had been complied with, they could apply for permanent land-use rights, the plantation could be formally registered and a land tax exemption triggered. The LFAP guidelines applied specific principles intended to limit the establishment of trees in the landscape, for example river banks should be protected and only areas with slope 25–45% used for tree planting. They also provided for the allocation of land to families according to certain socio-economic conditions, for example households in which one member was a civil servant but not living in a

village could be allocated one or two land parcels for industrial tree plantations but they were prohibited from undertaking shifting cultivation. This allowed for land accumulation within families that were already better off, with no inherent need for an income based on wood production.

While tree planting on agricultural land was and continues to be discouraged, the requirement that degraded land was to be the focus of plantation activities has meant that areas of fallow swidden land have been converted to permanent tree crops. One of the reasons for this was the provision that any land allocated, including agricultural land, could be returned to the village for reallocation after three years if not used appropriately. To retain the use rights of unutilised land, households planted trees (Newby et al. 2012), which effectively quarantined this land from future or alternative crop production, or allocation to others. It also allowed for those households to be allocated additional agricultural land resulting in land accumulation at the local level.

The response to these policies has been an observed boom in teak plantations in northern Laos although estimates of the extent of the resource vary widely. Reported areas of smallholder teak in Luang Prabang Province range from 10 000 ha (Midgley et al. 2007) to 26 000 ha (Midgley et al. 2017). Total areas of teak plantation in Lao PDR also vary with estimates between 40 000 ha (Midgley et al. 2017) and 50 000 ha (DoF 2015). This 'smallholder teak plantation resource' is now seen by government and industry as having the potential to make a substantial contribution to national objectives for the development of domestic wood processing sector (Ozarska et al. 2010), as well as provide benefits to smallholders. However the exact extent, character and availability of the resource remain unknown.

Plantation regulations

Forestry Law (06/NA 2007), together with Land Law (04/NA 2003), set the overarching legislative framework for forests and plantations in Lao PDR. The general intent is that the establishment, management, harvesting and the sale of timber from plantations is the responsibility of the plantation owner, with a level of oversight by government. Subordinate instruments have been developed to guide the allocation of land to plantations, set the technical and silvicultural requirements for establishing plantations and promote investment in tree plantations (Smith 2014; Smith & Alounsavath 2015).

Incentives for tree plantation establishment are set in Decree No. 96/PM (2003) *Regarding Commercial Tree Planting and Environmental Protection*, including:

- Land used for plantations is exempt from land tax (after 3 years, if planted in accordance with Law on Forestry).
- Compensation is payable to tree growers in cases where their land is to be used for public benefits.
- Owners of registered plantations are exempt from reforestation fees, forestry resource fees and other taxes in cases where the felling of planted timber is for household use and public benefit.
- Owners of registered plantations are exempt from reforestation and forestry resources fees where the use of timber from plantations is for domestic use and for export; however income tax must be paid.

- Technical assistance for collecting seeds, nurseries will be provided.
- There will be consideration for government-supplied credit for tree planting and the supply of good quality saplings.

Since the late 1990s there has been a regulatory emphasis on plantation registration, promoted in conjunction with a number of donor-supported land titling projects. The original intent behind plantation registration can be inferred from the legislation, which emphasises 'efficient management', 'quality', 'consistency' and 'economic performance'. More recently plantation registration has been promoted and used by different stakeholders for other purposes including plantation and land sales, government revenue, tax exemptions and incentives, land tenure security, compensation after compulsory acquisition, to provide collateral for microfinance loans and most recently as a means to certify the origin of the timber to reduce the risk that it has been illegally harvested from natural forest. Over time plantation registration has become a basic requirement to establish and demonstrate the legality of plantations and the timber they produce (Smith 2014) and it is now embedded in regulatory steps throughout the timber value chain to the point of export.

The regulations for other steps along the value chain including the harvesting, transporting, sale and export of plantation timber have also emerged from those developed for natural forests, and there are numerous examples of inconsistency or omission that complicate the application of these rules. Some legal texts explicitly include or exclude reference to plantations while in others omission is by oversight rather than intent. Thus a general rule, which may be intended to apply to plantations because they are not excluded, may not be applied because reference to plantations is not explicit. This results in the need for subsequent notifications resulting in regulatory complexity which may not be well communicated for implementation.

The governance of the plantation teak value chain is characterised by overlapping jurisdictions and the devolution of responsibility for implementing and enforcing of rules from the central to provincial, provincial to district, district to kumban (village cluster) and kumban to village level, exacerbate the risk of misinterpretation and misapplication by authorities. These complex regulatory and governance environments have resulted in high transaction costs which either serve to constrain individual smallholder participation in the market or encourage participation in informal processes that circumnavigate the rules. Weak enforcement of plantation regulations provides further opportunities for evasion. This regulatory complexity and red tape, together with multi-jurisdictional, overlapping and hierarchical governance has resulted in an institutional environment that may be incomprehensible to smallholders.

Farmer organisations

The development of farmer groups, cooperatives and associations has been promoted by governments and development programs worldwide as a means of improving the livelihoods of smallholders. They are viewed as an important link between growers and the market and rationales for farmers to work in small groups (Bonitatibus & Cook 1995; NAFRI 2011) include:

- economies of scale
- more production and income
- acquisition of new skills
- provision of inputs and technology
- improved price negotiation power
- meeting regulatory requirements.

In Asia, while there are many examples of successful farmer organisations based on agricultural commodities such as rice, dairy and vegetables, examples of successful tree grower organisations are less common. In Lao PDR policies for the promotion and development of such organisations has been influenced by history and economic policies and there are relatively few examples of 'modern' cooperatives (Castella & Bouahom 2014) and only recently have farmers been encouraged to organise themselves relatively independently of government. In 2007, a smallholder coffee association in the Boloven Plateau (Association des Groupements de Producteurs de Café, or AGPC) was registered with the Ministry of Agriculture and Forestry in an attempt to obtain certification for smallholders in international markets. More recently, two new decrees, the Decree on Associations (No. 115/PM, 2009) and the Decree on Cooperatives (No. 136/PM, 2010) were passed by the Lao government in an attempt to boost the productivity of the agriculture and forestry sector (Ling 2012).

The current strategy for farmer organisations in Lao PDR, described by Sisanonh (2013), is as follows:

- Farmer organisations will develop in a diverse and evolutionary manner.
- Farmer organisations will be self-determined, voluntary and independent.
- Affirmative action will be taken to promote and support farmer organisations for women.
- Farmer organisations will provide smallholder farmers with a mechanism for participating in commodity value chains, particularly through contract farming public-private partnerships.

The Luang Prabang Teak Program (LPTP), a partner in this ACIAR project, has been supporting the teak sector in Luang Prabang since 2008. LPTP was established with the aim of increasing prices paid to smallholder teak farmers by both improving teak management practices and enabling access to international markets that demand certified timber. With support from The Forest Trust (TFT), LPTP has achieved accreditation from the Forest Stewardship Council (FSC) to certify farmer groups and processors that comply with the FSC standards (Ling 2012). Four teak grower groups have been established by LPTP and registered with the District Agriculture and Forestry Office (DAFO).

Study area and methods

Study area

The project research area was Luang Prabang Province of Lao PDR. The province is economically divided, with farmers on the plains along the Mekong River and its tributaries having relatively high incomes due to fertile soils and proximity to the main town of Luang Prabang. By contrast, the mountainous soils further inland have only limited market access and government services. Here animist ethnic

minorities (such as Hmong and Khmu), who combined make up most of Luang Prabang's population, base their livelihoods on shifting cultivation and the collection of non-timber forest products for consumption and sale.

Direct identification mapping to characterise the teak plantation resource

In order to characterise the teak plantation resource, direct identification mapping was undertaken using high-resolution aerial digital photography. The essential requirement of the imagery was that it be of a resolution that enabled consistent accurate boundary definition and delineation of strata for subsequent inventory. A review of available imagery was undertaken; digital aerial photography from the National Geographic Department (NGD), provided by FINNMAP and captured in 2013–2014 was determined to be the best option.

The study used a classification based on characteristics that are observable and mappable from the imagery based on size class and canopy features.

Teak plantations were mapped through on-screen visual interpretation using ESRI ARC GIS to a minimum polygon size of 0.35 ha. Mapping of smaller polygons, 0.16–0.35 ha, was undertaken in a 26 ha sample area within one village to allow an estimate of this additional area of plantation across the province.

Ground truthing of the mapping was undertaken as required to identify and classify plantations using GPS-enabled ground photography. The photos were then linked to their locations in the GIS mapping environment.

Regulatory analysis

The regulatory environment for smallholder plantations was explored through a review of available laws and regulations, systems mapping of the regulatory process and structured interviews of farmers.

A system mapping approach was used to set out the legal context and process. Systems mapping is a common tool in value chain analysis but less commonly applied to regulatory analysis. The core concept is that a complex whole may have properties related to the whole but that are meaningless if viewed only in terms of the component parts (Collins et al. 2015). By applying a systems-mapping approach it is possible to

- visualise networks to gain an understanding of connections between actors and regulatory processes
- demonstrate the interdependencies between actors and processes
- identify regulatory constraints and possible solutions at different levels in the value chain.

Combining systems mapping with a value chain approach, laws and other legal sources were categorised according to value chain steps and sites of regulation: land allocation, plantation establishment, plantation registration, timber harvesting and removal, transport, sales, processing and export. The regulatory steps related to each activity were then mapped out to develop a network of regulatory tasks and dependencies. Regulatory fees and costs were also identified at key points on the value chain.

Structured interviews were undertaken with farmers to understand their perceptions regarding one key regulatory

process: plantation registration, which was identified during scoping for this ACIAR project as a potential barrier to farmer participation in legal teak timber value chains. Interviews were undertaken in January 2014 with 68 households in five teak-growing villages in Luang Prabang Province. Purposive sampling was undertaken to identify farmers who owned teak plantations and this sample was then differentiated on the basis of whether their plantation had been registered or not.

Survey questions were focused on land use rights, plantation ownership, the registration process (where applicable) and the perceived benefits of registration as well as timber harvesting and sales. Contextual information about household ethnicity, income, education and assets was also collected.

Further information was collected through interviews undertaken for the ACIAR project FST/2012/041 on teak-based agroforestry systems to enhance and diversify small-holder livelihoods in Luang Prabang Province. One hundred and fifty-nine households were surveyed in three districts in November 2014. While these interviews were designed to analyse the role of teak in rural livelihoods, questions relevant to teak plantation registration were also included.

Action research for grower groups

Action research was chosen by the research team to encourage the development of practical solutions which could be jointly implemented between growers and the researchers over the life of the ACIAR project (Ling 2014). Action research has been described as a rich and diverse family of approaches which seek to bring together action and reflection, theory and practice in participation with others (Gill et al. 2010). All action research starts with identifying the problems with clients (in this case grower groups) and then proceeds to design interventions with the grower groups aimed at resolving these problems. The effects of these interventions are evaluated to determine the extent to which the problem has been resolved, and also to learn from the results obtained before moving to the next action research cycle. There are an indeterminate number of cycles of diagnosis, planning, intervention and evaluation.

Six cycles of action research were undertaken at regular intervals between 2013 and 2016 in the four LPTP villages of Kok Ngiu, Ensavanh, Xiang lom and Lak10 in Luang Prabang with the grower groups. Members of the grower groups were divided into two subgroups according to their position in the group, being either members of the committee or ordinary growers. Within each subgroup, the team used semi-structured interviews to identify and address constraints and opportunities, and convert these to an action plan for the next interval. Both subgroups subsequently came together to discuss their differences and agree on a joint action plan for the group.

All action plans were drawn up on large sheets of white paper and left in the village. Field notes were taken in Lao and English and typed up for later analysis.

Results and discussion

Teak resource characterisation

The mapping identified and classified around 15 000 ha of teak plantations in Luang Prabang Province. Of this:

- 39% was classified as 'young', in size classes <15cm diameter
- 37% was classified as 'intermediate', in size classes of 15–25cm diameter
- 4% was classified as 'mature', in size classes >25cm diameter.

Twenty percent (20%) of the teak plantation area is of mixed size class or is partially planted with other species.

The plantations are geographically distributed across the province but are concentrated close to roads and rivers, indicating early take-up of the most accessible available land. While there are some relatively large contiguous mapped blocks (up to 150 ha) these do not represent homogenous units in classification.

Investigation of the small, scattered teak areas found that patches of up to 0.07 ha could be identified reliably as teak from the aerial imagery, but boundaries were difficult to map accurately. Individual and small groups of trees were also hard to differentiate because their appearance was significantly affected by surrounding and underlying vegetation where they were located in home gardens. Characteristics in common with those of other tree species resulted in false identification where teak were not planted in stands.

Plantation regulations

The regulatory research and systems mapping revealed a substantial body of laws and regulations relating to plantations and plantation grown wood in Lao PDR (Smith 2014; Smith & Alounsavath 2015) and a complex governance structure (Smith 2014).

With respect to plantation development and registration, numerous regulatory requirements were identified, although the steps, incentives and fees were relatively clear in the various regulations and instructions.

Each individual tree planting parcel, whether owned by a household or an organization, must be registered with the authorities concerned by:

- requesting that the village forestry unit conduct a survey of the parcel; define the plantation age, method and spacing/system of planting and tree species; and produce a sketch map and issue a certificate
- preparing an application to the District Agriculture and Forestry Office (DAFO), including a letter of application, a certificate of residence, a land declaration/certificate of land ownership, land tax receipts, the certificate from the village forestry unit and a sketch map of the planting parcel. DAFO then issues the plantation registration certificate.

In order to be eligible for registration plantations must:

- be an area of 1600 m² (1 *rai*)
- have trees three or more years of age
- be established according to the specific planting arrangements made in departmental instructions
- have a survival rate of 80% or more based on the total saplings planted
- have attained a height of a minimum of 5 m for fast-growing species and 3 m for slow-growing species.

There is an underlying requirement that some form of land use right is held in order for a plantation to be registered. The relationship between plantations ownership and the demonstration of land use rights is complex. Under the LFAP, TLUCs were issued for three years and together with a plantation contract they gave a farmer the right to establish a plantation on a parcel of land in accordance with the regulations and the plantation contract. If the conditions were met, after three years the plantation owner could apply for both permanent land use rights and plantation registration: however, permanent land use rights are not a requirement for plantation registration and plantation registration does not confer permanent land use rights to the farmer. Nevertheless, a *de facto* relationship has emerged between plantations and land ownership and there is a general assumption that ownership of trees and land co-exist; planation sales also result in land transfer.

This issue is exacerbated through a persisting lack of certainty for smallholders over the term of their plantation registration; the regulations do not specify if plantation registration expires with harvesting. However, it is generally understood that plantation registration lapses when a plantation is harvested if the land reverts to non-forest. This has implications for long-term management and harvesting regimes adopted by farmers who may be discouraged from applying harvesting regimes that optimise sustained wood supply for fear of losing land use rights. Furthermore, should plantation owners clearfall and replant teak they are required to repeat the plantation registration process and meet the associated costs again. As a result plantation owners typically selectively harvest a few trees as needed, leaving the stand relatively intact.

Despite the incentives, the level of registration remains very low. To date the Luang Prabang Teak Program (LPTP), for example, has completed registration for 857 plantation parcels covering an area of 646 ha, an average parcel size of 0.75 ha. Given the mapped teak plantation area was 15 000 ha, it can be estimated that around 4% of the plantation area has been registered since 2008—a rate of about 100 ha per year. This sample represents only one program, however; other estimates suggest that about 10% of plantation are registered (Smith 2014). Much of the work undertaken by LPTP, which is externally funded, has been proactive, with the team actively targeting and promoting plantation registration in teak-growing areas. For District and Provincial Forestry offices, operational and administrative constraints, including low levels of government funding, limit their capacity to undertake this work, which must be balanced with higher priority tasks.

Land tax incentives

Exemption from paying land tax has been a long-standing policy incentive intended to motivate plantation owners to register their plantations. On the basis of the low level of registration observed, however, the effectiveness of this incentive must be questioned. During interviews undertaken in this study, when asked about their reasons for registering their plantations, only 15% of plantation owners viewed land tax exemption as a benefit. Rather, farmers reported that receiving a higher wood price, obtaining legal land use rights and because the registration was being paid for by LPTP were the main factors in registering their plantations. Lesser benefits included obtaining the plantation certificate, market access,

selling the plantation and family benefits. For owners of un-registered plantations, the benefits of participating in the plantation registration process were unclear; more than 60% of respondents did not know what the benefits might be and only 10% saw land tax exemption as a possible benefit.

The relative worth of the land tax incentive can be made apparent by comparing the costs of registering a plantation and subsequent harvesting with generating revenue from the sale of wood. The land tax for tree plantations ranges from 8000 to 25 000 LAK ha⁻¹ depending on the type and location of the land. For an average teak plantation parcel of 0.75 ha this would amount to a minimum of 6000 LAK or AU\$1 per year, or in the order of 180 000 LAK payable over an optimal rotation of 30 years (Hansen et al. 2005), noting in reality average rotation lengths are typically much shorter (Fogdestam & Gålnander 2003). While regulations specify a fee of 1000 LAK per 1600 m² (0.16 ha) for registering a tree planting parcels, or 4600 LAK per average parcel size, the observed total costs are much higher, ranging from around 90 000 LAK as set out in regulations (Smith 2014; Table 2) to up to 150 000 LAK per parcel (Midgley et al. 2011) or 300 000 LAK per certificate (Schneider 2014). Farmers would rather pay 6000 LAK in land tax per year than up to 300 000 LAK in one payment. This cost, in conjunction with the time and effort needed to undertake the administrative steps required, is a deterrent for plantation owners to comply.

While the intent of the regulations is that all plantations should be registered, in reality many plantation owners, and some government employees, interpret the regulations as requiring plantation registration in order for wood to be *sold* and it is unsurprising that a plantation owner may opt to delay registration until just before selling wood and being guaranteed of an income to offset that cost. Furthermore, despite requirements for plantation inspections to be undertaken by district forestry officers, the remote nature of the resource, coupled with scarce departmental resources means that inspections are few and the risk of sanction is consequentially low. Checking of plantation registration is more likely at the time of harvesting and sale when other monitoring tasks also need to be undertaken.

Table 1. Teak plantation mapping classification

Class	Size class (dbh)	Unthinned	Thinned
Young	<15cm	1	1T
Intermediate	15–30cm	2	2T
Mature	>25cm	3	3T
Mix diameter	All	4	
Teak and other species (50/50)	All	5	
Possible teak	All	6	

Table 2. Costs associated with plantation registration

Procedures	Fee per ha (LAK)	Average cost (LAK based on 0.75 ha)*
Survey fee (Kip/ha <5 ha)	80000	60000
Application form	4000	4000
Application stamp	5000	5000
Plantation registration certificate	20000	20000
Total	109000	89000

*excludes per diem paid to government employees

Plantation harvesting

At the time of timber harvesting and sales, there are additional procedures and substantial regulatory fees to be paid (Table 3). These fees may be incurred by the plantation owner or by a trader depending on the nature of sales. Actual costs vary, as reported by LPTP based on actual sales, by Said (2015) based on fees and charges stated in regulations, and by Midgley et al. (2011).

In Luang Prabang farmers tend to sell trees for income on an as-needed basis, often for unplanned expenses (Ling 2014) and large annual costs such as school fees (Antilla 2016). Similar observations have been made of smallholder plantation practices in other countries (Rohadi et al. 2015). The immediacy of need and burdensome nature and costs of the tasks associated with registering, harvesting and selling trees act as deterrents to compliance. Individual smallholders may opt to sell wood to traders as standing trees and pass on these administrative responsibilities and costs. This reduces the price paid for wood and the potential contribution to farmer livelihoods (Schneider 2014; Antilla 2016). According to Antilla (2016) farmers prefer to pay traders or contractors to undertake the approvals processes and harvesting operations and receive a lower price for their wood; fees charged for approvals for harvesting can represent up to 16% of the price paid to farmers for standing trees (Smith, this study). Lack of familiarity with the procedures and the opportunity cost associated with the time required to obtain documentation are also key considerations for farmers in Vietnam who, from an instrumental perspective, weigh up the costs and benefits of compliance, and transfer the risk of non-compliance and sanction to the trader (Hoang et al. 2015).

For many farmers the main purpose for initially planting teak was to gain formal land use rights, and while wood sales and wood price are lesser factors, teak contributes little to regular household income (Table 4, this study and see also Ling 2013; Newby et al. 2014). The factors that motivate farmers to harvest their teak are based on these values and immediate need. Together with regulations and transaction costs that deter compliance, these create an unpredictable supply of wood which challenges the development of effective policy measures for national wood processing industries.

Grower groups

Grower groups, such as those set up by LPTP, are often established to help farmers increase their participation in markets and control of the value chain and provide vertical linkages between individual plantation owners and wood

Table 4. Sources of income as a percentage of household total

Income source	Proportional sources of household income	
	Registered plantations	Unregistered plantations
Teak	7	3
Livestock	9	3
Agriculture	44	36
Natural wood	0	0
Labour	7	5
Other	32	52

buyers or processors (Castella & Bouahom 2014). In addition to providing members with services such as credit, input supplies, marketing and guidance, grower groups may also assist individuals to navigate complex regulations and to reduce costs through economies of scale. Assisting plantation owners to comply with plantation registration regulations so that they can sell wood is a key objective of grower groups in Luang Prabang.

One of the strengths of grower groups and cooperatives is their ability to build economic capital out of social capital (EDC 2002); their effectiveness is contingent upon norms of the members and the legitimacy of the group administrators. Solidarity within the group, established through regular interaction and a common history with broadly accepted social rules, norms and sanctions are important (Castella et al. 2011; Castella & Bouahom 2014; Baird & Vue 2015). In Luang Prabang smallholder diversity, coupled with agrarian change and social differentiation, are thought to be impacting the development and the sustainability of plantation grower groups. Ling (2014) suggests that factors that underpin the effectiveness of the grower groups in Luang Prabang, such as trust, goodwill, connectedness and common livelihood, are being eroded by increasing levels of inequality within communities. Ling's research supports that of Newby et al. (2012) who report agrarian differentiation has allowed better off farmers and absentee owners to capture most of the benefits from teak plantations.

The legitimacy of grower groups may be being undermined by poor leadership, lack of transparency, excessive fees and cultural factors. While initial research suggested that this inequality appears to be undermining social capital and a long-term commitment to join grower groups, later rounds of action research suggested that farmers are simply practical, being willing to join a grower group if it helps them to sell their timber. In 2014, an additional seven members urgently wanted to join the Xianglom growers group, and raised their displeasure during the action research meeting over the slow pace of receiving a free plantation certificate which would allow them to sell their timber (even though, of course, they had ample opportunity to join the group over the previous four years). This highlights the

Table 3. Costs associated with harvesting and haulage

Procedure	Costs (LAK)		
	Midgley et al. 2011	LPTP, pers. comm.	Said 2015
Pre-harvest measurement of standing volume	7 700/m ³	7 000/m ³	8 000/ha
Application for harvesting permit	Not specified	10 000/m ³	5 000/m ³
Logging certificate	7 700/m ³	10 000/m ³	50 000/ha
Log measuring and grading	40 000/m ³	5 000/m ³	20 000/m ³
Log stamp at log landing ²	12 000/m ³	10 000/m ³ + per diem 35 000 ¹	10 000/m ³
Certificate for transport	7 100/m ³	30 000/load	10 000/m ³

¹Where government employees are required to provide a service (for pre-harvest timber inventory) a per diem must be paid. Official per diems are stipulated in Decision No. 2348/MOF, 2008 on Public Administrative Budget expenditure Norms (Improved) – Annex IX.

additional challenge of sustaining teak grower groups: unlike short-term crops, teak sales are not decided by seasonal supply, and farmers have no interest in contributing to a group when they have no timber to sell. The action research showed that despite project interventions to support grower groups, they were difficult to sustain due to this irregular nature of timber sales: this not only meant that the growers themselves were inactive in group activities outside the immediate period when they wished to sell timber, but it also discouraged buyers seeking a regular supply of timber. The lack of regular timber sales meant, in turn, that there were no meetings, which disrupted the social cohesion within the groups, resulting in a lack of transparency, and then finally to disinterest or mistrust among members. The legitimacy of the group is thus undermined.

These social factors, which influence smallholder behaviour and decision-making, undermine the sustainability of the groups. Lack of legitimacy will affect the sense of obligation that members may feel about complying with the rules of the group and social inequity may erode norms that may previously have encouraged group solidarity. Individuals may feel no reticence about taking advantage of opportunities to sell outside the group if they are offered a higher price elsewhere, since sales may be perceived to be a one-off. This is unlike rubber growers, for example, who rely on their group leaders to facilitate monthly sales on their behalf (Ling 2014).

As rational actors, plantation smallholders will choose among alternatives based on their self-interests and calculations of the expected costs and benefits of compliance or risk of sanction (Ramcilovic-Suominen & Hansen 2012). Farmers may choose to join grower groups to obtain the benefit of plantation registration but subsequently opt-out if markets do not emerge or profits are not fairly distributed. If the cost of compliance is too high or incentives to offset this are inadequate, smallholders may choose alternative channels which provide them easy access to markets but which may further undermine the local legitimacy of the group.

Informal markets may be attractive because they reduce red-tape and transfer the risk of sanction to other actors in the value chain such as middlemen, who often face indictment for exploiting smallholder farmers and acquiring an excessive market share (Perdana & Roshetko 2015). In reality, however, traders provide a vital role in the teak value chain and assume much of the risk, both regulatory and market-based, between plantation and mill gate (Midgley et al. 2017). New, largely unexplored networks between farmers, grower groups, informants and traders are emerging around new economic opportunities. Individuals and groups are increasingly able to deal directly with each other and the international economy (Bainton 2009), circumventing regulatory bottlenecks in the value chain. These networks are in need of further investigation if new measures to improve the efficiency of the teak value chain are to be effective.

Implications for legal and certified timber markets

Smallholder plantations grower groups like those described in this paper, and also in Indonesia, have been viewed as appropriate means of helping farmers meet market requirements for legality and certification. These programs increase the costs and effort required by growers to sell their trees with the expected outcome being improved market access and

price. However, these initiatives have not increased the price or market certainty for smallholders, nor in the case of teak growers in Laos have they been able to accommodate the unpredictable supply associated with the factors that drive wood sales. Many farmers would rather sell a standing tree to a trader and receive immediate payment, rather than take the risk and time of harvesting their own trees and/or selling to a certified buyer as a group. In the case of grower groups, farmers feel that the benefits of group participation are not worth the costs (Ling 2015).

Non-compliance with regulations by smallholder plantation owners and failings of grower groups to facilitate market access have implications for the achievement of both long-standing domestic policies intended to promote domestic wood processing and newer international policies such as those intended to deliver legal wood to the international market. Australia, the European Union, North America and other countries increasingly require the demonstration of legality for wood imports, and countries such as Lao PDR are responding through instrumental policy measures designed to define legal wood, meet certification standards and encourage the enforcement of relevant legislation.

Programs such as the EU FLEGT-VPA pursue instrumental approaches to improved compliance by establishing clear definitions of timber legality and strengthening enforcement efforts. Forest certification programs add a level of scrutiny over the sustainability forest practices that place a high burden of responsibility on smallholder—conceivably at a level which may not be commensurate with the scale or magnitude of risk associated with their practices (Flanagan & Laity 2015). They also try to standardise the differences in smallholder practices and judge these on the basis of criteria that are largely externally lead (Kusumawati et al. 2013). Research undertaken in association with this ACIAR project, as with that conducted elsewhere, suggests that such approaches create additional transaction costs for smallholders and are unlikely to elicit compliance (Ramcilovic-Suominen & Hansen 2012; Flanagan & Laity 2015; Rohadi et al. 2015). Furthermore the anticipated financial benefits have not been forthcoming. In 2016 LPTP made the decision not to renew their FSC certification due to lack of wood sales.

Conclusions

The research undertaken by this ACIAR project makes a number of contributions to understanding of smallholder grown teak in Lao PDR which may be useful in enhancing the value chain and developing future policies.

Mapping and characterising teak plantations may reveal a previously hidden asset but it does not automatically make it available to market. It is erroneous to treat the teak plantation as a homogenous resource owned by smallholders with a common objective. New policy measures must recognise that past policy interventions have resulted in the emergence of a complex and dynamic agrarian environment in which teak plantations have become an asset under diverse ownership arrangements with multiple livelihood functions. Past incentives, such as land use rights and land tax exemptions, which were effective in promoting plantation development, may not be effective in encouraging smallholders to realise their asset in a way that also meets the needs of industry. Reforms need to consider whether existing measures are

still valid and without this review, codifying existing regulations to meet new legality requirements could create a legislative environment that is impossible for smallholders to comply with. This may further exclude smallholders from markets and pragmatic growers may choose to sell timber through informal channels at reduced prices, where there is a low risk of sanction.

New entities, such as grower groups, create new networks, but also simultaneously include and exclude participants. Their effectiveness will be contingent upon perceptions of their legitimacy and the degree to which they can co-opt normative dimensions of individual behaviour to deliver benefits to the group. Ultimately, membership of the group will be contingent upon its ability to generate more benefits than costs.

Policies may reinforce universalising tendencies and apply generalisations about the targets of interventions, and while some level of generalisation may be necessary, the human factor cannot be overlooked when designing regulations which are intended to change human behaviour. When smallholder plantation owners are treated as a homogenous group with ubiquitous aspirations, and their plantations are viewed as a common asset to meet national policy objectives, friction may occur. Policy making and regulatory reform needs to be expansive and take into account the normative as well as instrumental factors that influence compliance if they are to be effective.

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