

Factors constraining and enabling agroforestry adoption in Viet Nam: a multi-level policy analysis

Elisabeth S. Simelton · Delia C. Catacutan · Thu C. Dao ·
Bac V. Dam · Think D. Le

Received: 27 February 2015 / Accepted: 10 February 2016 / Published online: 22 February 2016
© Springer Science+Business Media Dordrecht 2016

Abstract Agroforestry is known to have multiple economic and environmental benefits. Despite this, the adoption of agroforestry in Viet Nam is limited both in extent and diversity of components and practices. Our study identified gaps for agroforestry adoption in current policies and policy implementation. National policy and provincial instructions and decisions were reviewed and discussed during ten stakeholders' consultation workshops. The review and workshops concluded that there were no specific national and few provincial specific policies promoting agroforestry. In addition, the segregation of policies into agriculture and forestry, promoted monoculture practices and discouraged the integration of mixed annual and perennial tree

species. Completing the forestland allocation process was considered essential for long-term investment on land and providing collateral for loans. More holistic policies, such as a provincial strategy for agroforestry development that would enable flexible integration of agriculture, forestry and livestock were perceived to be more effective and inclusive to poor and non-poor farmers. Specific cross-cutting budget allocation would be necessary for capacity building, upscaling agroforestry models, procurement of high-quality inputs, and establishing post-harvest processing and marketing investments.

Keywords Agroforestry · Policy incentives · Land tenure · Monoculture · Policy dialogue · Extension

Electronic supplementary material The online version of this article (doi:[10.1007/s10457-016-9906-2](https://doi.org/10.1007/s10457-016-9906-2)) contains supplementary material, which is available to authorized users.

E. S. Simelton (✉) · D. C. Catacutan · B. V. Dam
World Agroforestry Centre (ICRAF Viet Nam), Ha Noi,
Viet Nam
e-mail: e.simelton@cgiar.org

T. C. Dao
Viet Nam University of Agriculture, Ha Noi, Viet Nam

T. D. Le
Ministry of Agriculture and Rural Development, Ha Noi,
Viet Nam

Introduction

Agroforestry has long been considered a promising farming practise for improving the livelihoods of smallholder farmers while having positive environmental impacts. Agroforestry also features as a climate-smart agriculture practice that enhances food security and serves adaptation and mitigation objectives (FAO 2013). Despite many positive characteristics, the spread of integrated agroforestry systems in Viet Nam has been reserved and limited to a few types of 'models'.

Agroforestry in northern Viet Nam

Technically, agroforestry can be referred to as integrated in each field or segregated, i.e. mosaic landscapes of annual and perennial crops. The northern uplands of Viet Nam feature three main types of formal agroforestry farming systems. The VAC-R system (garden-pond-livestock-forestry) expanded from the 1960s and particularly after the renovation policies in the 1980s (*doi moi*). VAC-systems were promoted by Viet Nam's Garden Association (VACVINA) and served multiple purposes, in particular, household subsistence and soil improvement. Still, while many farmers may never have heard the term 'agroforestry', when it is explained they associate it with VAC. Large-scale deforestation started during the war and continued by state-run forest enterprises up to the 1980s, when the era of rehabilitation projects started (de Jong et al. 2006, Sikor 2011). Yet, seeing rapidly declining forest areas, the Government pushed strongly for reforestation in the 1990s, and 'taungya' system became a popular approach to transition from staple crops via a few years intercropping, to closed forest canopy (Nguyễn and Catacutan 2013). Lastly, in the market-oriented phase, shorter-term intercropping systems have become widely spread, such as legumes between staple crops like maize and cassava, while perennial cash-crop agroforestry systems have developed in certain geographic regions, e.g. tea with shade trees, mixed fruit trees (Hoang et al. 2013).

The historical context: agriculture versus forestry policies

Some selected key policies affecting land uses in Viet Nam uplands over the last four decades are summarised in Fig. 1 and detailed in Supplementary Table A1. These policies have had sometimes two incompatible foci: turning shifting cultivation into sedentary farming and deforestation into reforestation and timber production (e.g. Dinh 2005, Clement and Amezaga 2008). First, shifting cultivation (swidden agriculture) on sloping lands was traditionally practised by ethnic groups as nomadic or sedentary spatiotemporal rotations of annual crops and forestry. Some maintained shifting cultivation on some land once they had a fixed house (Nguyễn et al. 2007). Still to this day, northwest Viet Nam is among the

regions tagged as remote and difficult areas with high poverty rates and ethnic minorities, where programmes have been implemented to address deforestation, eradicate hunger and poverty and promote rural development (such as 135/1998/QĐ-TTg and 30a/2008/NQ-CP). These programmes often involve elements of both environmental protection and socioeconomic development that are less compatible to the priorities and livelihoods of ethnic minority groups (Truong 2012).

The state control over land use, particularly in the lowlands, gradually loosened up as a means to combat food insecurity, marking the end of the collective period via the Directive 100/1981/CT on production contracts and Resolution 10/1988/ND, better known as the Household Responsibility System. The 1993 Land Law, which facilitated allocation of land use rights in the form of Red Books aimed to convert to sedentary farming, and increase agricultural production in the uplands by giving individuals, households and organisations a 20-year lease of agricultural lands. In 1994, forestland allocation started with the Green Book, and gained a similar legal status as the agriculture land (Red Book) with Decision 163/1999/ND-CP on land allocation and lease of land for forest purposes—this means that forest lands that can be used by households and private companies over a 50-year lease period. While many lowland provinces have completed the land allocation process, the forest land allocation is still ongoing in the upland northwestern provinces as of 2014.

The importance of land tenure on land use and investment has been widely studied. Under the Government 'Resolution 10', cooperatives managed prime agricultural lands (relatively flat to rolling lands) while sloping lands were mostly used by households as supplementary income source, leading to increased environmental stress on slopes. Due to uncertain land tenure, farmers continued to use unallocated forestland for annual subsistence crops rather than tree plantation. Studies show that sedentarisation policies brought about shorter fallows with insufficient time for soil recovery. (Castella et al. 2006). Even for households with land use rights certificates, the threat of reallocation discouraged farmers in Yen Chau district in the northwest from investing in soil conservation measures, including agroforestry (Saint-Macary et al. 2010). This

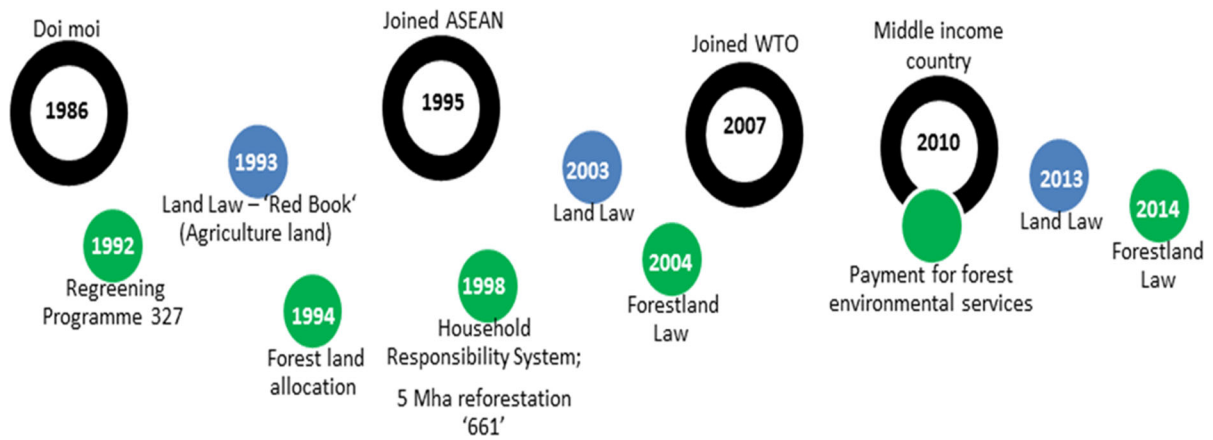


Fig. 1 Major policy milestones since 1986

contrasts with findings from the southern uplands by Ha (2011), suggesting that soil conservation measures were not associated with neither tenure nor income, but with awareness of soil erosion. Moreover, for the northern uplands, Pham et al. (2007) found that land fragmentation had negative effects on both labour efficiency and household incomes in Red River delta and Yen Bai province. Land fragmentation is potentially linked to the prescribed land use, however two near nation-wide studies show disagreement on the role of designated paddy land use for rural development. According to Markussen et al. (2010), panel data with over 2000 households show that crop choice restricted diversity but did not affect household incomes, while the study by Giesecke et al. (2013) of over 9000 households, maintain that it consolidated poverty and nutrient-poor diets.

Several studies conclude that the Land Use Reforms resulted in short-term economic gains at the expense of long-term sustainability, leading to environmental costs (e.g. Castilla et al. 2006; Saint-Macary et al. 2010; Ha 2011). Subsidised high-yielding crop varieties and fertiliser were intended to redirect farmers' attention from the uplands to paddy fields (Meyfroidt and Lambin 2008a). However, high-yielding maize varieties for fodder became available in the 1990s, replacing much of hill rice and cassava, which at least protected soils during the high-intensity summer-monsoon rains. Additionally, while the reforestation policies had positive effects on the forest cover, the species-rich natural forests were exchanged with poor quality forest plantations (Hoang and Do 2011).

Policy incentives and disincentives

The first national workshop on agroforestry was organised in Viet Nam in 2012. While the proceedings report on a number of promising concrete agroforestry research experiments and project-initiated models, typically at smaller scales (Catacutan et al. 2013), directions for how these findings could be further outscaled and contribute to policy were missing.

The overall purpose of this study was to base policy recommendations on robust evidence from analyses of constraints and enabling factors for agroforestry adoption at the national level and locally, in northwest Viet Nam. For this purpose, we adopted the concept of 'incentives' from Enters et al. (2004) (also adopted by e.g. Ng'endo et al. 2013) to denote financial or material rewards provided by the Government bodies (see Table 1) to which a group or individual responds. Our primary interest were in farmers' responses, although these may be affected by for example, extension workers and market actors. Incentives can *directly* stimulate returns to investments or *indirectly* change the situation. Indirect incentives can be *variable*, meaning that economic factors are implemented to affect the net return of an investment, or *enabling*, that is having a greater impact on decision-making through a wider coverage. Correspondingly, with disincentives, we refer to policies that discourage, hinder or deter the anticipated response(s).

DFID and WB (2005, pp 12–13) identify several transmission channels through which policies may

Table 1 Types of policies included in the policy review

Policy type	Vietnamese name and code	Issued by
Law	Luật	The National Assembly
Resolution	Nghị quyết (NQ)	The National Assembly The Standing Committee of the National Assembly The Government (CP) The Prime Minister (TTg) Ministers (MARD—BNN-PTNT; MONRE—BTNMT) Heads of ministerial-level agencies
Ordinance	Pháp lệnh	The Standing Committee of the National Assembly
Decree	Nghị định (ND)	The Government (CP) The Prime Minister (TTg)
Decision	Quyết định (QĐ)	The State President Ministers (MARD—BNN-PTNT; MONRE—BTNMT) Heads of ministerial-level agencies Provincial/district/commune People's Council (Hội Đồng, HĐ) Provincial/district/commune People's Committee (Ủy Ban Nhân Dân, UBND)
Directive	Chỉ thị (CT)	The Government (CP) The Prime Minister (TTg) Ministers (MARD—BNN-PTNT; MONRE—BTNMT) Heads of ministerial-level agencies The Politburo of the Central Committee of the Communist Party (Bo Chinh Tri)
Circular	Thông tư (TT)	Ministers (MARD—BNN-PTNT; MONRE—BTNMT) Heads of ministerial-level agencies
Guideline instruction	Hướng dẫn Chỉ đăn	Provincial People's Council (HĐ) Provincial People's Committee (UBND)
Official letter	Công văn	District/commune People's Council (HĐ) District People's Committee (UBND)

cause impacts: (i) employment and job creation; (ii) prices of production, consumption and wages; (iii) access to goods, services and infrastructure; (iv) changes in asset values, which can be due to changes in their levels or their returns, corresponding to direct variable indirect incentives above. Asset endowments include five types of capital: natural (such as land, water), human (such as education, knowledge and skills), financial (such as a savings account), social (such as membership in social networks that increase access to information or resources), and physical (such as housing). Policy changes such as land reform, reallocation of public spending or macroeconomic policy can have a direct or indirect impact on people's ability to invest in or draw down on their assets or to maintain returns to their assets;

(v) transfers and taxes, including public and private flows; and (vi) authority covers changes in power, structures and processes that govern the formal and informal function of public institutions. The transmission channels are typically connected. For example, in the case of agroforestry, investment in infrastructure can improve farmers' access to inputs and markets, and thereby create demand for agroforestry products (Tchoundjeu et al. 2010).

In the context of Viet Nam (Fig. 1), corresponding policy content and implementation can be clustered around land use, knowledge and technology transfer, socioeconomic development, natural resources management, and markets. In the northwest region, agroforestry regions have boomed around highways and tourist areas building on local comparative

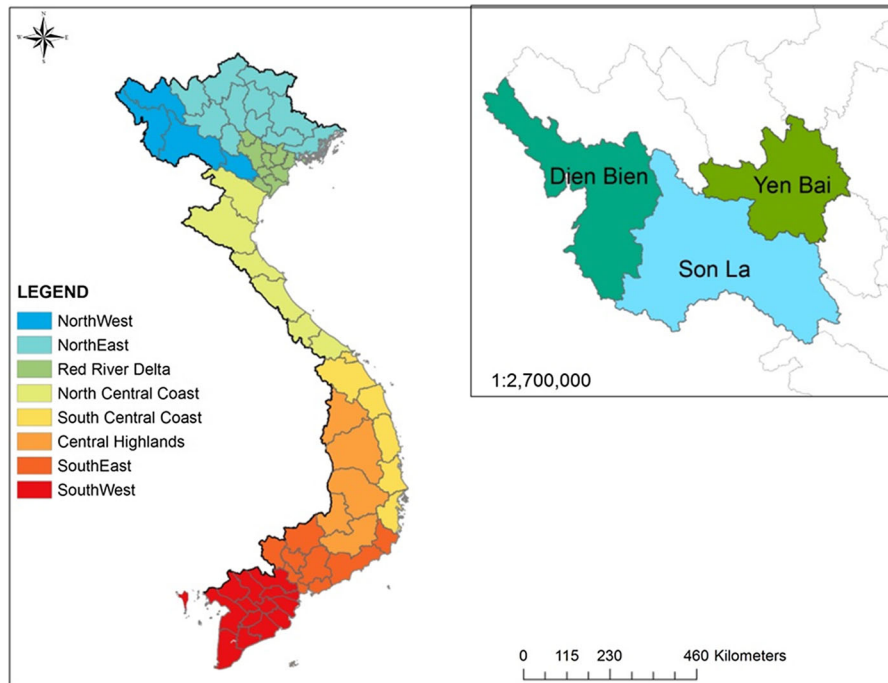


Fig. 2 Location map of study sites in Northwest Viet Nam

advantages, such as the tropical fruits in Moc Chau and shan tea in Mu Cang Chai districts. The challenge for policy makers is to identify what will set trains in motion elsewhere. Infrastructure investments alone may not create sufficient incentives. Gaps between policies and implementation can be evident as disrupted transmission channels. For example, institutional power over land reforms through dual land use classification systems. The Ministry of Environment and Natural Resources (MONRE), in charge of cadastral services, views all upland as forestland (as upland cultivation is prohibited) and the intention is to have it reforested, while the Ministry of Agriculture and Rural Development (MARD) distinguishes between cultivated and forested forestland (uplands) where the latter is based on the existing tree stand (Meyfroidt and Lambin 2008b). Policies make a clear distinction between agriculture and forestry while actual land use does not. Despite that the merger of the Ministry of Agriculture and the Ministry of Forestry into the MARD in 1995 could appear beneficial for promoting agroforestry, the two sectors remain largely divided. Fortunately, People's Committees at the local level, can overcome the dichotomy by ratifying or crafting more specific decisions.

Materials and methods

Context and study area

This study was undertaken in the context of the World Agroforestry Centre's project, "Agroforestry for Livelihoods and the Environment (AFLI)" for smallholder farmers in northwest Viet Nam. The AFLI project is testing new on-farm agroforestry systems in the three provinces in the region namely, Dien Bien, Son La and Yen Bai (Fig. 2), developing smallholder nurseries, conducting market-value chain analyses and building capacity of local extension workers.

The objectives of the policy research were (1) to review policies concerning agroforestry, and (2) to initiate a policy dialogue on agroforestry development at national, provincial and local levels.

Policy review

The desk-review of existing policies relevant to agroforestry focussed on identifying policy incentives and disincentives (Enters et al. 2004) for agroforestry adoption, gaps/weaknesses inherent in the policies or implementation issues/challenges at the national, the

Table 2 Generic categories of reviewed policies

Policy category	Description
Land	Policies specifying land use, land allocation and tenure
Sectoral development	Policies on agriculture, forestry and/or agroforestry development
Science, technology and extension	Policies supporting improved quality of seeds, technology and equipment, training and knowledge transfer through extension services
Capital and credit	Policies on direct support for farming households, e.g. loans, benefit sharing
Marketing	Policies supporting processing and marketing of agroforestry products
Sustainable development	Policies relating sustainable agriculture practices, natural resources management and environmental protection

northwest region and sub-provincial levels. The review covered all agroecological zones that can be considered for agroforestry and tree plantation, while policies for paddy fields were excluded. The DFID and World Bank's transmission channels were used as checklist to ensure a wide range of aspects (DFID and WB 2005). The review was done through an iterative process, where the policies were listed and disseminated at two informal workshops with government officials and policy makers at local and national levels (types of documents included in the review are listed in Table 1). This was done prior to the stakeholder workshops in order to account for variations in local implementation of the policies and locally formulated policies. To aid the subsequent stakeholder workshops, policies were clustered into eight groups. Based on feedback from the initial workshops, the policy categories were reduced to six, with several policies falling into more than one category (see Table 2).

Stakeholder workshops

The policy review results were presented and deliberated at ten formal workshops at the district ($n = 6$), province ($n = 3$), and national ($n = 1$) levels between September and November 2013. The workshops were conducted in Tuan Giao and Tua Chua districts in Dien Bien province; Tram Tau and Van Chan districts in Yen Bai province, and Mai Son and Thuan Chau districts in Son La province. The workshops started at the district level to certify that their recommendations were reported to the next government level. The groups were facilitated by an

agroforestry policy expert. A note-taker documented the discussions and a short report was written up after each workshop.

The district level workshops lasted one day and consisted of a brief orientation on agroforestry, a brief review of the policies identified in plenary, followed by groupwork. Participants (about 20 in each workshop) were divided into two groups. Commune and district government officials from the departments of Agriculture and Rural Development and Natural Resources and Environment, and local agri-businessmen assessed factors constraining and enabling agroforestry development in terms of the policies. Agroforestry farmers and commune extension workers identified examples of local agroforestry systems, and policies that had influenced those systems. The workshops ended with a plenary discussion aiming to extract factors that would enable agroforestry adoption.

The province and national level workshops lasted a half-day and were divided into two sections as above, and sharing recommendations from previous workshops. The participants represented MARD and MONRE, national research institutes and universities, leaders from two districts that were not part of the previous review, development organisations and the private sector. In the provincial and national workshops, participants (about 30 for each workshop) were divided into one group for leaders and one group with officials, practitioners and agri-businessmen. Each group received a handout with the listed policies for further revision. The revised shortlist of the key national policies and related policy category is available in Table A1 Supplementary Material.

Table 3 Examples of existing promising agroforestry systems in the three provinces

Agroforestry systems	Location	Support
Two-storey systems, mixed annual-perennials		
Cardamon under forest canopy	Dien Bien	DANIDA
<i>Fructus amoni</i> under forest canopy	Son La	Free seeds from the AFLI project
Ginger or vegetables (pumpkin, <i>Sauropus androgynous</i>) under fruit trees	Son La	
Chicken under coffee or rubber	Son La	Free rubber seedlings
Coffee with shade and windbreaker trees species	Dien Bien	
Timber trees (eucalyptus, pine, acacia) intercropped with upland rice	Dien Bien	Agriculture inputs and extension support from the province
Timber trees (eucalyptus, acacia) with annual crops (beans, cassava, maize, vegetables)	Yen Bai	Forest protection
Timber trees (eucalyptus, <i>Acacia mangium</i> , pine) with annual crops (beans, cassava, maize, vegetables)	Son La	Forest protection
Tea and shan tea (<i>Camellia sinensis sanon</i>) intercropped with annual crops (food crops, beans), fruit trees, timber trees (<i>Manglietia conifer</i>) and grasses (Mulato, Ghile)	Yen Bai	ALFI, other projects
<i>Tephrosia Candida</i> with hill rice, maize, cassava or pine apple	Son La	Free seeds and training, extension advice from JVC, Japan
Taungya systems		
Soybean, ground nut → eucalyptus	Dien Bien	Initial inputs from the national government
Annual crops (hill rice, beans), fodder grass → rubber	Son La	
Mixed perennial systems		
Forest trees (pine, <i>Schima vallichii</i>) and fruit tree (<i>Docynia indica</i>)	Yen Bai	Conversion from bareland
Tea or coffee, fruit trees (longan, plum) and/or annual crops	Son La	Free seeds, 50 % fertiliser, some training from Viet Nam Academy of Forest Science (VAFS)

Results

The results are divided into three sections. First, we present examples of existing agroforestry systems from local farmers and extension workers in district workshops. Next, we present district, provincial and national stakeholders' identified policy and implementation gaps and last, their recommendations.

Existing agroforestry systems

A closer look at some existing agroforestry models presented at the commune-district workshops (Table 3) shows that external project support was important for establishing demonstrations. For example, in Dien Bien province, a DANIDA-funded project implemented cardamon growing under forest canopy in Muong Nhe Natural conservation area, and shade and windbreaker trees for coffee plantations. In Si Pa Phin commune, the Department for Science and

Technology (2010–2012) supported the intercropping of timber trees with upland rice. Furthermore, MARD and the National Extension centre funded taungya system with eucalyptus intercropped with soybean and groundnut the first year (2012–2013). The workshop participants said the projects had positive economic and environmental effects, such as more stable short and long-term income, reduced soil erosion and improved soil fertility, limiting slash-and-burn and increasing forest cover, however each project covered less than 50 ha.

In Son La province, widely spread agroforestry included taungya systems of short-duration crops intercropped with fodder grass planted during the early establishment phase of rubber plantations. Sloping lands typically had forests in the upper parts with perennial industrial crops, fruit trees and/or food crops in the middle and lower sections of the slope. Two-storey systems included ginger or vegetables under fruit tree canopies, and chicken under coffee or rubber.

Starting in 1996 with funds from Japanese JVC, some 5–6 H'mong households in Long He, Thuan Chau district were using *Tephrosia candida* for green mulching on steep slope maize, cassava and rice fields, as they considered it a cheap fertiliser that also tackles soil erosion. Rather than supporting fertiliser, farmers were trained to make their own and in 2013, the number of households adopting the agroforestry practice had doubled through farmer-to-farmer dissemination. The AFLI project, starting in 2012, is testing a high value species, *Fructus amoni* (sa nhan) under forest canopy. Furthermore, Son La stakeholders mentioned a great variation of timber and fruit trees as well as grasses.

Yen Bai agroforestry models included the taungya systems of annual crops and traditional timber trees, some higher value permanent systems with tea or shan tea intercropped with food crops, grasses, fruit or timber trees. For conversion from bareland to protection forests, enrichment with mixed timber and fruit trees were possible. Agroforestry, in particular the VAC-systems, allegedly contributed to the province's increase in forest cover, household food security and economic development.

In summary, the presented agroforestry systems had diverse combinations for subsistence and markets, a few traditional mixed with new species, sometimes involving new planting technologies. In particular, taungya systems with timber trees and staple crops were popular. In all examples presented at the workshops, land had been allocated and the role of incentives was evident, such as planting material, sustained yields and markets. According to the Dien Bien-farmer groups, a successful model was seen as returning at least 100 million VND¹ annually per household. Despite project and policy support, few models had been multiplied autonomously or out-scaled beyond the demonstration sites.

Policy and implementation gaps

This section highlights the main policy and implementation gaps by six policy groups. Stakeholder feedback on the policies are synthesised in Table 4. The relevant national policies included in the review are listed in Supplementary Materials Table A1 with some specific comments from provincial workshops.

¹ 1USD ~22.000VND.

Land policies

Although policies on land allocation for individuals, households and organisations have existed since the 1990s (Resolution 10/1988/NQ, Land Laws), the implementation had not been completed, which resulted in reluctance amongst farmers to invest in longer-term tree-based systems. Also, the allocated lands were small scattered plots requiring essential labour and time spent for walking between the home and fields. With less time, farmers preferred the simpler systems (typically monoculture of annual or perennial species) to maximise labour inputs. In Son La province, agroforestry development was affected by the slow progress of land allocation, complicated procedures for borrowing money and putting land as collateral, and poor promotion of agroforestry, while short-term crops and fodder grasses were less dependent on land tenure status.

Sectoral policies

Overall, few policies concerning agriculture and forestry ('nong lam') specifically mention agroforestry in its integrated sense ('nong lam ket hop'). Workshop participants at commune and province levels, perceived the terminology to be restricting agroforestry systems. Some participants interpreted 'nong lam' as not directly disallowing agroforestry, however, subsequent policy paragraphs specifying species electable for support would rarely incentivise integrated agroforestry. For example, several national agriculture policies could be applied for agroforestry, such as support for terraced fields, fertiliser and converting from annual to perennial cash crops (e.g. Resolution 30a/2008/NQ-CP). However, the development plans for strategic food crops, expansion of cash crops as well as reforestation promoted monoculture. Many province-level policies in Dien Bien were developed for specific plants, such as rubber, coffee and watermelon, which discouraged intercropping. Reforestation seedlings were provided as one specie that could only be accessed on one occasion, rather than for sequential plantation (Decision 147/2007/QD-TTg). Furthermore, it was unclear how the 0.62 Mha specifically targeted for agroforestry in the forest development strategy for 2006–2020 (Decision 18/2007/QD—TTg) were distributed sub-nationally. In Son La, policies for forest

Table 4 Synthesised feedback from ten stakeholder workshops in Dien Bien, Yen Bai and Son La provinces and at the national level

Policy group	Sector development		Science, technology and extension	Capital and credit	Marketing and product distribution	Sustainable development
	Agriculture	Forestry				
Advantage	<p>Farmers in districts with complete land allocation are more likely to invest in long-term land uses, such as agroforestry.</p>	<p>There are some existing policies that enable full support for certain crops and tree seedlings, such as for rubber plantation. There is support for forest protection and plantation (both an incentive and disincentive for agroforestry).</p>	<p>Some small-scale agroforestry models and some new technical training are implemented at commune level.</p>	<p>Build on lessons learned from the short-term credit support that is already available for poor households.</p>	<p>Distribution to markets is dominated by private traders (but disorganised and poor quality control).</p>	<p>Numerous policies are pro-poor policies and enable agroforestry development, such as Program 30A</p>
Limitations	<p>Land allocation and cadastral documents are incomplete. Work on allocating and delineating boundary and land use rights is lagging. Conflicting allocation results between MONRE (allocate land) and MARD (allocate forest).</p>	<p>Policies are uncoordinated and ineffective because there are too many agroforestry agencies involved. The support is not for what farmers demand.</p> <p>Financial support is too low to encourage (some) farmers for forestry and agroforestry (somehow mixing agriculture crops and trees). Policies for household and community forest management and production are unclear, insufficient.</p> <p>There are no/few overall policies for agroforestry, or specifically for land, investment, training and marketing</p> <p>Difficult to mix support for agriculture and forestry, or for more than one species on the same piece of land. The support is considered “used up” once it has been received for one species and one field</p>	<p>Little support for training, developing and upscaling of agroforestry models. Training at the local levels in general is uncoordinated and irrelevant for promoting agriculture/forestry/agroforestry products that meet market demand.</p>	<p>Long-term investment opportunities are unavailable. Complicated lending procedures. Available loans are for too limited purposes. There are no loans for investing in agroforestry production. Difficult for near-poor households to borrow money (no Red Book means no collateral).</p>	<p>Links between farmers and markets are weak. Most middlemen are private and act individually. Having few choices who to sell to, farmers cannot negotiate prices. Markets (farm-gate prices and consumers) for agroforestry are unstable. Existing policies for product distribution do not relate to agroforestry producers.</p>	<p>Poor households often have insufficient size of land for agroforestry, or have not received Red Book for forestland</p> <p>Local extension and government staff are underpaid and underfunded</p> <p>Policies for sustainable socioeconomic development and environmental development are uncoordinated</p>

Table 4 continued

Policy group	Land	Sector development		Science, technology and extension	Capital and credit	Marketing and product distribution	Sustainable development
		Agriculture	Forestry				
Policy—implementation gap—Recommendations	Stronger policies to convert bare sloping upland to forestry (via agroforestry).	Build on existing good models and support. Develop better local guidelines where existing policies require more detail.		Earmark financial resources from State/provincial budgets to: Develop agroforestry models at commune levels; Organise coherent basic to intermediate training on agroforestry at the commune level for farmers, farm and extension workers, agricultural technicians; Upscale existing promising agroforestry models in the commune/district; Support for high-quality local/locally suitable varieties (quality control of seedlings), nursery, production technologies and organic fertiliser that can reduce production costs and stimulate sustainable cultivation; Permit support networks for agricultural technicians and farmer interest groups.	Policies enable long-term loans for agroforestry development and simplified lending procedures. Diversify the assortment of credits; Expand the existing credit support for the poor to all households and extend the payback period; “Package” to develop post-harvest processing industries with start-up loans, means to increase productivity, modern equipment; Direct support for on-farm production and links with businesses.	Study market demand before investing in agroforestry models/policies. Promote agroforestry production chains by: Developing guidelines for quality control; Policies promoting market stability and transparency; Macro-plans to avoid over-supply and ensure stable prices, e.g. contract-farming with production quota (minimum prices). Enhance distribution channels for producers to access markets; Price and market information improved infrastructure capacity for local agroforestry harvest and basic processing technology, storage capacity farmer and producer interest groups/associations; Standardised quality control from seedling to production, e.g. certification, labelling of agroforestry products.	Raise public and businesses' awareness about sustainable land uses, socioeconomic and environmental benefits associated with agroforestry Comprehensive policies on developing agroforestry with food security, land and environmental protection goals. Agroforestry targeted for ethnic minorities, such as supporting indigenous species.
Policy Gap—actionable recommendations	Complete land allocation. Land and forest allocation with certificate is a requirement for agroforestry development = all land is allocated with Red Book (This requires strengthening the technical capacity of commune cadastral officers to complete measurements in field and farmers' participation). Improve the coordination between MONRE and MARD on land allocation.	Policies clearly enable the integration of agriculture and forestry, directing upland production towards agroforestry instead of monoculture. Specify agroforestry is incorporated into the agriculture and forestry land use plan policies. Establish regional agroforestry production zones. Active participation of land users in land use plans. Raise financial support to forest management and production.					

Table 5 Policy recommendations for comprehensive agroforestry development

Agroforestry system	Low input	Transition	High input
Target household type	Low-income households Unallocated land Risk averse Remote, poor infrastructure	Allocated land Some savings	High-income household Secure land tenure Risk tolerant Access to infrastructure
Land	Build capacity of commune cadastral officers Complete land allocation with Red Book Add agroforestry as a land use option to avoid confusion between agriculture and forestry		
Agriculture, Forestry, agroforestry	Reforestation seedlings with local multi-purpose tree species encouraging transition into permanent agroforestry on slopes	Stress-tolerant varieties	High value seedlings for agroforestry, grafted varieties
Credit	Increased start-up capital for establishing permanent perennial trees (seeds for plantation, support for protection) Long-term credit access (Women's Union, banks)	Use own savings and preferential long-term bank loans to develop agroforestry systems	
Science, Technology and Extension	Make high-quality germplasm available at local nurseries Establish simple agroforestry systems Train extension and farmers on suitable small-scale agroforestry systems business plans to start build-up own capital for more complex agroforestry	Increase the assortment of species at local nurseries	Evaluate and upscale agroforestry models Test complex agroforestry systems Train extension and farmers on higher-input agroforestry
Market	Establish farmers' groups to negotiate better prices and market access Training on business plans for extension and farmers	Develop local post-harvest processing and storage Market-value chain to find marketable products Geographical indicator potential	Certification
Sustainable development	Sustainable sloping land technologies apply to all land uses to reduce soil erosion, enhance mitigation	Translate environmental benefits to economic values	Make agroforestry eligible for PES

plantation and protection could reduce the need for cultivation on very steep slopes, nevertheless upland staple crop cultivation was still seen as providing more stable income for households than paddy rice or timber production.

Capital and credit policies

Agriculture inputs and financial incentives were considered a main driver for most land use change in the uplands. The stakeholders identified a number of policy gaps related to support and access to credit. In particular, financial incentives for forest protection (200,000 VND/ha/year) and conversion of uplands (2–3 million VND/ha) lasted to short time (2 years) and were too low

to make substantial differences on livelihoods, such as providing incentives for farmers to use the money to invest in agroforestry. Stakeholders in Son La said the State support to poor ethnic households should be raised (from 1.5 million VND/ha/year). For the Dien Bien farmers, economic support were important and funding below 40 % of the required investments was considered insufficient.

Existing policies enabled farmers to use the Red Books (land tenure certificates) as collateral for a bank loan, however, not all households had them. No information was available on how many actually used certificates as collateral. Furthermore, difficulties to get longer-term bank loans discouraged long-term investments needed for tree-based systems .

Science, technology and extension policies

The dichotomy between agriculture and forestry was reflected in the implementation of extension policies. The demonstration farmers were knowledgeable about informal integrated systems and native species. However, agroforestry was generally perceived as technical, thus requiring training—especially by extension workers who often were trained in either agriculture or forestry. The underfunded and understaffed extension system was said to cause short-duration models and discontinued projects. Specifically, the Extension Centre in Son La disclosed that they were unable to meet their five tasks, particularly the latter three: (i) sharing information; (ii) providing training; (iii) establish appropriate and scientific demonstration models; (iv) offer consultation services and linking farmers to markets; and (v) engaging external partners to collaborate on extension activities (domestic and international exchange). Commune extension workers had insufficient time and resources to travel and train farmers. Dien Bien province had some funding for agroforestry demonstration models, but nothing for following up and scaling out established agroforestry models. Dien Bien stakeholders said resources for maintaining “good agroforestry models” were too low and shortlived, and inadequate to address farmers’ needs. As result, some policies were reportedly not actually implemented, such as training for farm workers and activities related to marketing and distribution.

Farmers prioritised fast economic returns, and few factored in economic and non-economic benefits of reduced soil erosion and other longer-term payback. For example, despite having learned sloping land cultivation technologies, some farmers maintained traditional ways of planting maize up and down the hill rather than along contours. In response, The Board for Ethnic Minorities in Son La and the agricultural extension center collaborated on supporting a new grass variety (VA06) to combine quality fodder production as soil erosion control along contourlines.

Market and distribution policies

Policies relating to markets and distribution were nearly inexistent, such as support to farmers entering the post-harvest part of the value chain. Son La participants said that agroforestry was less attractive

to farmers than forest plantation because of lower support for inputs and lack of agroforestry processing industries. Yen Bai stakeholders said the power of the supply chain was effectively in the hands of business owners. For instance, the market was dominated by a few independent (private) merchants who set prices of unprocessed products at will, such as fruit. Few cooperatives and state-owned enterprises were involved in tea and wood processing.

Yen Bai government officials perceived the policies as fragmented and disorganised, supporting the supply side only (through inputs for planting) but not the consumption or demand side, through product, processing and market-value chain development. Despite several State-run and development projects providing infrastructure (e.g. QD2945/2007/QD-BNN-KL), market access was seen as restricted by transportation facilities and lack of market information channels. Specifically, while Dien Bien had a policy on subsidising transport costs from certain remote areas, it was unclear how this benefited farmers. For example, in Thuan Chau district participants mentioned that they need 5–6 tonnes of coffee to rent a truck, and as long as nobody had this amount or owned a truck, they depended on external merchants. It appears that if coffee-farmers were better connected with each other and the markets, they could form a producer group to aggregate their produce and rent trucks themselves.

Sustainable development policies

With policies prioritising support for the poor who often have insufficient land areas to invest in agroforestry (and forestry), the farmers with enough land to invest in non-subsistence cultivation, benefited little from economic and technical support. On one hand, Dien Bien stakeholders said that policies focused more on poverty alleviation and food security and less on environmental sustainability or suitability with local (social and environmental) contexts, e.g. farmers could get 4 million VND once for starting up grass plantations. On the other hand, Son La stakeholders thought that recent forest policies were too targeted at environmental protection and would inhibit the development of both forest plantations and agroforestry in the long-run. For example, the Decree 99/2010/NĐ-CP policy on Payments for Ecosystem Services (PES) covered only forestry

and would not benefit agroforestry (Table A1, Supplementary Material).

Stakeholders' policy recommendations

The workshop participants agreed that unsustainable upland cultivation methods needed to be exchanged with more sustainable practices. One visionary policy statement was drawn from the workshops: 'Upland areas can be used for integrated farming systems, mixing agriculture and forestry—longer-term land use planning is urgently needed for agroforestry development'. Given that the policy gaps between agriculture and forestry provided loopholes for agroforestry development, their recommendations called for cross-cutting initiatives in general, and specific policies targeting agroforestry, flexible enough to absorb the different investment capacities of farmers. Four recommendations were formulated as follows (see recommendations in Table 4, and specific policies in Table A1, Supplementary Material).

Sectoral agriculture and forestry policies enabling joint actions

A concrete priority across all workshops to encourage more sustainable land uses was to complete the land allocation process (Decree 1/1995/CP) whereby all farmers receive land use right certificates.

The provincial stakeholders suggested province-specific strategies to encourage integration of agriculture, forestry and livestock (as opposed to monoculture). They said national policies related to poverty reduction, agriculture extension and forest development could be applied for such purposes. Government officials in Son La and Yen Bai gave examples of policies enabling the mix of annual and perennial agriculture and forestry crops, such as Decree 1/1995/CP on contracts for land allocation detailing land users' rights to production from integrated cropping, agriculture land allocation for perennial and annual crops, and protection, special use, and production forests. Furthermore, Decree 163/1999/NĐ-CP on forest land allocation and leasing of forest land, and Decision 178/2001/QĐ-TTg on rights to benefits and duties of forest and forest land users could be applied for agroforestry. According to Son La stakeholders, Decision 178 permitted 20 % of forestland to be used for agriculture and aquaculture.

Some national policies with provincial guidelines/specifications for reclamation or conversion of land for fodder for livestock also aimed to reduce soil erosion.

Providing high-quality inputs and knowledge for agroforestry

Training for extension and farmers was seen as a prerequisite for agroforestry adoption, such as technical training on how to establish, manage and protect plants (and livestock), set up demonstration models and provide technical updates over an extended time. A common request from farmers involved access to a greater selection of varieties, including local species that are more suitable to local environmental conditions—which indicates opportunities for diverse traditional agroforestry models. The Son La province-level stakeholders argued that higher quality seeds/seedlings were important to improve quality and yield while Yen Bai DARD officials said there were promising agroforestry models ready to out-scale, such as tea with *Manglietia* or cinnamon.

Technical capacity development as well as raising salaries were believed to motivate extension officers to work harder in disseminating agroforestry and overall delivery of extension services.

Long-term commitments on credit and investment to all farmers

Dien Bien stakeholders suggested that earmarked state budgets were needed for agroforestry development. Furthermore, Yen Bai participants stressed that policies needed to be based on local contexts and needs, that policy outcomes should be evaluated and policies adjusted accordingly. The Son La groups said that longer support was necessary to cut the negative spiral with short-duration projects, which only resulted in farmers jumping between sources of funding without long-term planning. Better conditions for credits and long-term bank loans were seen as essential to ensure more permanent rather than transitory (e.g. taungya) agroforestry systems. Increased State support for forest protection and poor households was raised particularly at commune-district levels, however, it was vague how such commitments would benefit agroforestry development.

All workshops concluded that support should be also available to non-poor households, to establish agroforestry models as the poor households often lacked land and labour to make full use of the meagre support provided by government.

Marketing and distribution: agroforestry producers can access markets

Basic processing facilities and marketing policies supporting farmers were considered essential for agroforestry adoption. However, the State's influence on markets was dual. Some participants argued that reduced State and middlemen's control over land use and markets, would strengthen farmers' position in the market. Others viewed that with agroforestry requiring long-term investments, price regulations were important. Examples included setting a price cap on agriculture inputs, production quota between farmer and local enterprises, and Government guaranteed minimum farm-gate price for export products.

Discussion

The section discusses three key interrelated disincentives factors constraining agroforestry adoption in Viet Nam, and three potential incentives for diversifying agroforestry. In this case, the six transmission channels identified by DFID and WB (2005) are useful to highlight the absence and presence of policies or policy impacts.

Disincentives

First, agroforestry was perceived as complicated, technical and requiring a minimum set of asset endowments (in particular natural, human and financial capitals), therefore not suitable for certain farmer groups and/or requiring skilled extension workers. Similar to the quantitative study by Saint-Macary et al. (2010), this shows that the presence of extension and farmers' organisations are significant for agroforestry. Further, a training needs assessment conducted in the AFLI project showed that at the commune level (the level closest to the farmer) most extension workers had received some training in agriculture or forestry, but typically only in a few species and not in integrated agroforestry. However,

this underlying presumption that agroforestry requires technology transfer, overlooks local knowledge. As a result many tree-crop interaction functions are underutilised and farmers do not gain the full economic or environmental potential, which may be one reason for poor uptake.

Second, there was a lack of commitment and continuity in policy intentions to unambiguously encourage integrated agroforestry. Policies explicitly mentioning agroforestry were more closely linked with forestry (Decision 178/2001/QĐ-TTg; Decision 163/1999/ND-CP), primarily for reforestation, i.e. taungya (Nguyen et al. 2013). Occasional policies appeared to encourage the integration of short-term crops with fruit trees or industrial species, however, after a closer look many were inadequate, such as Decree 1/1995/CP, as other plants could not be added later (the policy was replaced by 135/2005/ND-CP which does not mention agroforestry).

Agroforestry research often show household income and environmental benefits (Catacutan et al. 2013), however for wider expansion, the primary policy objectives for agroforestry appear poorly formulated with ambiguous contributions to broad socioeconomic and environmental development objectives. This can be compared to agriculture policies, which typically have the single objective to raise short-term economic incomes, and forestry policies, which contribute to the national forest cover. Moreover, the failure of high-yielding crops varieties to reorient farmers from sloping land cultivation, and the poor quality of forest plantations (Meyfroidt and Lambin 2008b; Hoang and Do 2011) are not seen as providing opportunities for agroforestry policy.

Commitment may also be viewed in the lack of public spending on agroforestry. A recent policy review by OECD (2015, pp. 171–174) demonstrates that Viet Nam's support to the agriculture sector for 2011–2013 was three times higher the average of OECD (as share of GDP), however the support was skewed towards rice and livestock, and negative for many upland agroforestry species such as tea, coffee and rubber. Despite that agriculture and forestry policies in Viet Nam seem to start from the narrative that poverty (and lack of knowledge) motivates unsustainable short-term plantation, policies do not offer long-term support to enable time to establish more permanent integrated systems that can generate stable income development. In fact, many policies

promoted monoculture practices, extension workers and farmers consequently chose simpler solutions with input support, such as maize or cassava, or reforestation with one or two tree State-supported species. This can be viewed against the reality that rural incomes have been steadily lagging those of urban citizens since 2008, and when forestry is counted as agriculture income the decline is even more pronounced (OECD 2015, p.59).

Farmers indicated that agroforestry's connotation with forestry discouraged investments in higher value and indigenous agroforestry systems. For example, Vuong (2011) reported that four tree species accounted for over 90 % of areas under the 661 program in northwest and northeast Viet Nam. However, despite considerable public investments, reforestation may only be a viable option for non-poor households (Clement and Amezaga 2008), as compensation levels in benefit-sharing systems such as forest protection and PES-payments are too low (Pham et al. 2013; Suhardiman et al. 2013; Dam et al. 2014), and compensations based on equal amounts per unit area would not survive if schemes were voluntary. While lowland rice farmers benefitted from the price support (OECD 2015), prescribed land uses including community forest protection and plantations, could constrain both labour and economic investments on other plots as farmers with small scattered fields far from their house were reluctant to invest in agroforestry. It has been argued that farmer incomes would increase by lifting the designated land use of agriculture lands (Giesecke et al. 2013), however this was not mentioned in the workshops. Instead, particularly district stakeholder arguments were more in line with Markussen et al. (2010), stating that the designated paddyland use affected labour allocation (rather than household incomes) on other land units.

The most recent Land Law and Forestland law of 2013 and 2014 were not included in our workshop discussions but exemplifies further dual messages. On one hand, the new Land Law (45/2013/QH13) extends the land lease from 20 to 50 years, which could encourage longer-term investments in permanent land uses, while on the other hand the Forestland law, states that nothing can be extracted from protection and special use forests (a policy called "Closing the door to the forest"), implying that incomes from other land uses will be increasingly

important. It is symbolic that most existing non-taungya agroforestry models in the northwest had been adopted through external projects, or initiated by food-secure and better-off households who had financed agroforestry without government incentives.

Third, disconnects between producers and markets were evident. Many farmers were unaware of what happened to their products after selling. Equally, businessmen joining the national workshop did not know how to reach farmers. Clearly, producer organisations and infrastructure improvements would better support market information (prices, actors, advice). Access to markets has been a lingering challenge for upland development since the policy reformations in the 1990s (EWC and CRES-VNU 1997, Castella et al. 2006). Although many products such as *Docynia indica* contributed to local industries, few examples of off-farm job creation were brought up. A thorough evaluation of the wider socioeconomic contributions of agroforestry may raise its reputation.

Incentives for diverse agroforestry systems

A summary of stakeholder recommendations for transitioning to high-input agroforestry is shown in Table 5. First, land allocation with certificate was suggested a fundamental starting point for agroforestry development. In addition, we argue that agroforestry needs to be recognised as a land use option. Given the restricted options stated in the Forest Law, besides home gardens only some land for forest plantation and upland agriculture, would otherwise be relevant for agroforestry.

Second, match interventions to respond to the current disincentives for agroforestry. Similar to Saint-Macary et al. (2010) and Ha (2011), our study showed that agroforestry adoption depends on many factors but economic benefits seem to be the main driver. This contrasts somewhat with most government officials and farmers in the workshops, who expected that remunerative rewards (Enters et al. 2004) through public investments would contribute to agroforestry development. In particular, they called for direct incentives (price regulation and subsidies) that influence returns to investments. In the absence of policy guidelines and public budget earmarked for agroforestry development, so far mainly farmers who could afford and were willing to stand the risks

themselves were investing in agroforestry in the northwest. Our workshop participants suggested different support levels depending on households' investment capacity. Depending on whether households are survival-, surplus-, or investment-oriented, Sikor (2011) suggests that programmes should share the investment risk with the survival-oriented households and they should be allowed to repay the loan at the end of the loan period, whereas the other two types should carry the risk themselves and repay on annual basis. While Sikor mentioned that surplus-oriented households would be able to borrow relatively more (a factor of five and three, respectively) than the survival-oriented and who would carry the risk, we find that the willingness to take (a perceived) risk is closely associated with the household's income level and the repayment conditions need to be associated with the loan and the anticipated return period of the agroforestry systems. Such individually attuned agroforestry systems would need to delicately balance local knowledge with required expertise on tree-crop interactions to avoid being seen as top-down and technically complicated.

Most importantly, competitive agroforestry systems may develop in less rigid policy environments. Examples from West and Central Africa highlight the need for permanence and flexibility, where Rural Resource Centers have been vital in promoting local entrepreneurship around agricultural diversification through long-lasting partnership between extension, non-governmental organisations and scientists (Tchoundjeu et al. 2010). The African cases contradict the findings by, e.g. Saint-Macary et al. (2010) and some stakeholders' perceptions in this study, that agroforestry is not for the poor or less educated farmers. Successfully outscaled agroforestry programmes elsewhere, such as the Landcare in the Philippines was a partnership between the initiating actor (in this case ICRAF) and local governments. Part of the success were attributed a clear scaling-out plan which allowed flexible site-specific solutions that addressed particular needs, in particular to respond to local market demand (Catacutan 2007). Vibrant farming systems develop local demand, only when not everybody grows the same products.

Our impression from conducting the workshops was a prevailing perception among the stakeholders that all agroforestry components should be implemented at once to consider the system "established"

or "finished". Only some farmers who already had agroforestry systems viewed it as a stepwise process where species were added and subtracted as household incomes improved, trees got older, or in response to market demand. More research is therefore needed for identifying agroforestry systems with gradually increasing complexity that could develop over time, depending on the farmers' investment capacity, and improvements in the market environment (Table 5).

Overall, establishing a forum for regular exchange between agroforestry research and policy could help raise awareness about the actual contributions of agroforestry that would remove some of the disincentives.

Conclusion

Our participatory policy analysis for agroforestry development in Viet Nam is neither complete nor comprehensive, nevertheless it clearly elucidates how agroforestry is constrained by the lack of clear policy and programme support at the national level, despite the vast landscape of forestry, agriculture, land and economic policies in the country. Aside from land tenure issues, smallholders are particularly affected by inadequate technical, physical and market infrastructure, and financial support to invest in agroforestry. More holistic policies, such as a provincial strategy for agroforestry development that would enable integration of agriculture, forestry and livestock were perceived to be more effective and inclusive to poor and non-poor farmers. Specific cross-cutting budget allocation is necessary for capacity building, upscaling agroforestry models, procurement of high-quality inputs, and establishing post-harvest processing and marketing investments. The diversity of farmers in terms of wealth status, educational attainment and ethnicity in Viet Nam calls for a holistic and flexible agroforestry policy that caters to different needs. Finally, the inadequacy of extension support for agroforestry development is a systemic issue that requires national level policy response.

Acknowledgments The research was funded by ACIAR project FST-2010-034 and CGIAR Research Program 6.4.1.1. The authors are grateful for the collaboration with the Ministry

of Agriculture and Rural Development and Dinh Thi Thu Ha, Pham Van Son, Vu Thi Luu, Nguyen Quy Quang and Nguyen Thi Nhan and the departments of Agriculture and Rural Development in Dien Bien, Yen Bai and Son La, respectively.

References

- Castella J-C, Boissau S, Nguyen H, Novosad P (2006) Impact of forestland allocation on land use in a mountainous province of Vietnam. *Land Use Policy* 23:147–160
- Catacutan DC (2007) Scaling up landcare in the Philippines: issues, methods and strategies. Southeast Asia Regional Research Programme, World Agroforestry Centre
- Catacutan D, Bui N, Nguyen VB, Bui THH (2013) Realizing the potential of agroforestry: Proceedings of the First National Workshop. 7 Dec, 2012 World Agroforestry Centre, Ha Noi, Viet Nam
- Clement F, Amezaga JM (2008) Linking reforestation policies with land use change in northern Vietnam: Why local factors matter. *Geoforum* 39:265–277
- Dam BV, Catacutan DC, Hoang MH (2014) Importance of National Policy and local interpretation in designing payment for forest environmental services Scheme for the Ta Leng River Basin in Northeast Vietnam. *Environ Nat Resour Res* 4:39
- de Jong W, Do DS, Trieu TH (2006) Forest rehabilitation in Vietnam: Histories, realities and future. Center for International Forestry Research (CIFOR), Bogor
- DFID and WB (2005) Tools for institutional, political and social analysis (TIPS). A sourcebook poverty and social impact analysis (PSIA). Department for International Development (DFID), Social Development The World Bank (WB)
- Dinh DT (2005) Forestry, poverty reduction and rural livelihoods in Vietnam. Ministry of Agriculture and Rural Development, Forest Sector Support Program & Partnership, Hanoi
- Enters T, Durst P, Brown C, Carle J, McKenzie P (2004) What does it take? The role of incentives in forest plantation development in the Asia-Pacific Region—Executive Summary Food and Agricultural Organization, Bangkok, Thailand
- EWC and CRES-VNU (1997) Case studies and lessons from Asia. East-West Center; Center for Natural Resources and Environmental Studies, Vietnam National University, Hanoi
- FAO (2013) Climate-smart agriculture—Sourcebook. Page 570. Food and Agriculture Organization of the United Nations, Rome
- Giesecke JA, Tran NH, Corong EL, Jaffee S (2013) Rice land designation policy in Vietnam and the implications of policy reform for food security and economic welfare. *J Dev Stud* 49:1202–1218
- Ha TV (2011) The linkage between land reform and land use changes: a case of Vietnam. *J Soil Sci Environ Manag* 2:88–96
- Hoang MH, Do TH (2011) Assessing the potential for, and designing, a ‘Payment for Environmental Services’ scheme in Bac Kan province, Viet Nam. World Agroforestry Centre (ICRAF), Hanoi
- Hoang TL, Simelton E, Ha VT, Vu DT, Nguyen TH, Nguyen VC, Phung QTA (2013) Diagnosis of farming systems in the Agroforestry for Livelihoods of Smallholder farmers in Northwestern Viet Nam project. World Agroforestry Centre (ICRAF Viet Nam), Hanoi Vietnam
- Markussen T, Tarp F, van den Broeck K (2010) The Forgotten Property Rights: evidence on Land Use Rights in Vietnam. *World Dev* 39:839–850
- Meyfroidt P, Lambin E (2008a) The causes of the reforestation in Vietnam. *Land Use Policy* 25:182–197
- Meyfroidt P, Lambin E (2008b) Forest transition in Vietnam and its environmental impacts. *Glob Chang Biol* 14:1319–1336
- Ng’endo M, Catacutan D, Kung’u J, Muriuki J, Kariuki J, Mowo J (2013) The Policy Environment of Conservation Agriculture With Trees (CAWT) in Kenya: do small scale farmers benefit from existing policy incentives? *Afr J Agric* 8:2924–2939
- Nguyễn TH, Catacutan D (2013) Nghiên cứu và phát triển nông lâm kết hợp tại Việt Nam: phân tích cơ hội và những vấn đề cần nghiên cứu. *Khoa học công nghệ*. 16–23
- Nguyen TH, Catacutan D, Do TH, Nguyen MP (2013) What drives reforestation in Viet Nam?, ASB Partnership for the Tropical Forest Margins. World Agroforestry Centre (ICRAF), Ha Noi
- Nguyễn VK, Trần NH, Nguyễn HH, Vũ VM (2007) Sản xuất nông lâm kết hợp ở Việt Nam. Bộ Nông Nghiệp và Phát Triển Nông Thôn, Chương trình hỗ trợ ngành lâm nghiệp và đối tác, Hà Nội
- OECD (2015) Agricultural policies in Viet Nam. OECD Publishing, Paris
- Pham VH, MacAulay TG, Marsh SP (2007) The economics of land fragmentation in the north of Vietnam. *Aust J Agric Resour Econ* 51:195–211
- Pham TT, Bennet K, Vu TP, Brunner J, Le ND, Nguyen DT (2013) Payments for forest environmental services in Vietnam. From policy to practice. CIFOR, Bogor
- Saint-Macary C, Keil A, Zeller M, Heidhues F, Pham TMD (2010) Land titling policy and soil conservation in the northern uplands of Vietnam. *Land Use Policy* 27:617–627
- Sikor T (2011) Financing household tree plantations in Vietnam. Current programmes and future options. CIFOR, Bogor
- Suhardiman D, Wichelns D, Lestrelin G, Hoanh C (2013) Payments for ecosystem services in Vietnam: market-based incentives or state control of resources? *Ecosyst Serv* 5:e94–e101
- Tchoundjeu Z, Degrande A, Leakey R, Nimino G, Kemajou E, Asaah E, Facheux C, Mbile P, Mbosso C, Sado T, Tso-beng A (2010) Impacts of participatory tree domestication on farmer livelihoods in West and Central Africa. *For Trees Livelihoods* 19:217–234
- Truong NT (2012) Poverty reduction strategies in an ethnic minority community: multiple definitions of poverty among Khmer Villagers in the Mekong Delta, Vietnam. *Asian Soc Sci* 8:196–208
- Vuong VQ (2011) Water and soil conservation over forest status. Vietnam Forestry University, Ha Noi, Viet Nam