

How not to cut down a tree:

A comparative study of forest policies, livelihoods and land use in Vietnam

Hvordan ikke hugge ned et tre:

En sammenliknende studie av skogpolitikk, levebrød og arealbruk i Vietnam

Philosophiae Doctor (PhD) Thesis

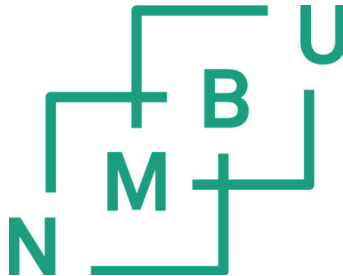
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Part II: Compilation of Papers

Paper 1: Trædal, L.T., P. Vedeld and J.G. Petursson 2016. “Analyzing the transformation of forest PES in Vietnam: Implications for REDD+”. *Forest Policy and Economics* 62:109-117. doi: <http://dx.doi.org/10.1016/j.forpol.2015.11.001>.

Paper 2: Trædal, L.T. and A. Angelsen 2016. "Sub-national forest transitions in Vietnam". Draft.

Paper 3: Trædal, L.T. and P. Vedeld 2016. "Livelihoods and land uses in environmental policy approaches: The case of PES and REDD+ in the Lam Dong Province of Vietnam". Under review in *Forests*.

Paper 4: Trædal, L.T. and P. Vedeld 2016: "Cultivating forests: Exploring the productive values of forest land in a reforestation zone of northern Vietnam". Under review in *Land Use Policy*.

Annexes

Annex 1: Survey questionnaire

Annex 2: List of interviewees

Summary

This thesis focuses on the role of forests and forest management in providing global environmental and climate services. The study analyzes multiple dimensions of forest-sector policy development, with a special focus on interactions between policies, livelihoods and land-use processes at sub-national levels in Vietnam. The Lam Dong and Bac Kan provinces are considered to be representative of the variations in forest-cover dynamics in the country, namely those of a *frontier* (deforestation) zone, and a *forest mosaic* (reforestation) zone. The study applied interdisciplinary conceptual frameworks, including institutional theory, political ecology and livelihoods theory, to investigate the research objectives. It also used Forest Transition (FT) theory as a narrative framework to understand the trajectories of forest-cover dynamics and policy processes. An interdisciplinary methodological approach was applied to respond to the research objectives of the study. The results may have important implications for emerging forest and environmental policy frameworks such as *payments for environmental services* (PES) and Reduce Emissions from Deforestation and forest Degradation (REDD+).

The findings reveal that ‘second-generation’ policy approaches, such as PES and REDD+, are unlikely to represent a paradigm shift in the history of forest management in Vietnam. As a result of institutional reproductions and ‘path dependency’, there is a rather high risk of prolonging existing approaches. Larger and more fundamental policy reforms, such as independence, the collectivization processes after the Second World War, and the market liberalization and decentralization reforms from the late 1980s onwards, were identified as fundamental explanatory factors for land-use dynamics in the contemporary history of the country. Furthermore, one-dimensional and reductionist land-use change explanation models, inherent to many of the emerging policy schemes such as PES, REDD+ and forest enhancement, risk overlooking the complexities of land use, livelihoods and underlying dimensions of the drivers of change. Complex institutional factors and the interests of more – or less – powerful actors, in the process of creating institutional bricolages, contribute to modifying and transforming policy programs and schemes into local adaptations.

The thesis presents four individual but interrelated papers that address different aspects and scales of policy development processes and impacts.

Paper 1: Analyzing the transformation of forest PES in Vietnam: Implications for REDD+

The paper analyzes the transformation of market-resembling environmental policy processes, exemplified by the implementation of forest PES in Vietnam. The paper applies a critical institutional path dependency framework to analyze the processes of institutional reproduction in PES encounters with actors and institutions at multiple levels, from the national to the local. PES policies did not enter an institutional vacuum, but instead were transformed through a process of reproducing existing institutional structures. This reflects not only established norms and values about ‘best-ways’ of organizing forest management, but also existing structures of power, tenure and the control by some groups over forest resources. In this sense, from a path dependency perspective, new and ‘innovative’ market-based approaches, such as PES, do not at all represent ‘critical junctures’. The findings of this study may have important implications for the prospects of implementing similar initiatives, such as REDD+, both in Vietnam and beyond. Thus future PES and REDD+ schemes should take into account the limitations and challenges of institutional reproduction, interplay and path dependency, to a higher degree in their planning and implementation.

Paper 2: Sub-national forest transitions in Vietnam

This paper compares forest transitions (FT), policy reforms and forest cover change in the Bac Kan and Lam Dong provinces of Vietnam. The country has seemingly been able to shortcut the perceived FT stages by quickly moving to the reforestation phase, which makes it an interesting case country. Provincial level forest cover and socio-economic trends are, however, not necessarily comparable and compatible within a FT analytical framework. Bac Kan is one of the poorest provinces, but has experienced forest regrowth and expansion of forest cover during the past couple of decades. In contrast, Lam Dong province has both higher GDP and population levels, but has had higher levels of deforestation, particularly linked to the expansion of perennial crops. This is quite contrary to what could be expected from a conventional FT hypothesis. The FT turnaround and land use dynamics were found to be linked to the overall and all-encompassing policy shift related to de-colonization, state-control and collectivization, and the *new shift* of “market-led socialism”, decentralization and land tenure reforms. The findings demonstrate that policies can trump typical FT patterns linked to general development trends. This provides a sense of relief in the way that the FT-trajectory is not unavoidable. Policies can make a difference. Yet, these policies have not primarily been guided by forest conservation concerns, but have rather been a side-effect of economic development and political objectives.

Paper 3: Livelihoods and land uses in environmental policy approaches: The case of PES and REDD+ in the Lam Dong Province of Vietnam

This paper explores assumptions about the drivers of forest cover change in a PES and REDD+ context in the Lam Dong Province in Vietnam. In policy discourses, deforestation is often linked to ‘poor’ and ‘ethnic minority’ households and their unsustainable practices such as the expansion of coffee production (and other agricultural activities) into forest areas. The paper applies a livelihood framework to discuss the links between livelihoods and land use amongst small-scale farmers in two communities. The findings of the livelihood survey demonstrate no clear linkages between poverty levels and unsustainable practices. In fact, the poorest group of households was found to deforest the least. The ways in which current PES and REDD+ approaches are designed do not provide appropriate solutions to address the underlying dimensions of issues at stake. The paper criticizes one-dimensional perspectives of the drivers behind deforestation and forest degradation often found in public policies and discourses. We suggest more comprehensive analyses of underlying factors encompassing the entire coffee production and land use system in this region. Addressing issues of land tenure and the scarcity of productive lands, and generating viable off-farm income alternatives seem to be crucial. Sustainable approaches for reducing deforestation and degradation could be possible through engaging with multiple stakeholders, including the business-oriented households in control of the coffee trade and of land transactions.

Paper 4: Cultivating forests: Exploring the productive values of forest land in a reforestation zone of northern Vietnam

The paper challenges the predominant forest-agriculture dichotomy perception in policy-making and research in Vietnam. Such dichotomies are not endemic to Vietnam, but permeate the whole climate and forest debate globally. This standpoint encompasses a perception that forests are of higher value kept standing and that agricultural practices, forest conservation and the sustainable use of forests are mutually exclusive activities. This study is based on a survey

carried out in the province of Bac Kan in northern Vietnam, and applies a livelihoods framework (LF) to investigate the multiple values of forest lands in household economies. The case demonstrates the complexities of adaptations to forest-sector policies, namely that households in different institutional and agro-ecological locations create and use landscapes differently along a forest-agriculture continuum. The findings on the multipurpose uses of forests may have important implications for climate-related forest policies, such as REDD+ and *reduced emissions from all land uses* (REALU). Policy makers need to engage with people and local communities, their social institutions and agricultural practices, and consider context-specific approaches for integrating the objectives of conserving trees, increasing carbon stocks, and enhancing the total productivity and total outcomes and values of landscapes. The study recommends inter-sectoral and multi-stakeholder policy approaches to integrate and mainstream multiple objectives, including forestry, agriculture, energy, and environmental services such as food production, carbon capture and storage, water provision, and biodiversity conservation.

The study concludes that predominant REDD+ discourses, such as those of *ecological modernization* and *green governmentality*, encompass presumptions and risks of one-dimensional and reductionist explanation models of the drivers of land-use change processes. In other words, there is an inherent logic – and need – to identify actors of change who must be compensated for refraining from cutting down trees, and supported in planting new ones. In reality, however, developing and implementing forest conservation and enhancement policies are highly complex processes, influenced by multiple sets of institutional and agro-ecological factors. Policy implementation and land-use change linked to livelihood processes are multifaceted and dynamic imperatives, influenced by multiple institutional structures and actors, with different interests and agendas. The need to act for more sustainable management of tropical forests seems to be indisputable; however in order to make REDD+ policies more efficient, effective and equitable, the institutional complexity and interests of multiple stakeholders need to be taken into account.

Sammendrag

Avhandlingen fokuserer på betydningen av skog og skogforvaltning i leveransen av globale miljø- og klimatenester. Studien analyserer ulike dimensjoner ved skogforvaltning og -politikk, med et spesielt fokus på samspillet mellom politikk, levekår og arealbruk på subnasjonale og lokale nivåer i Vietnam. Lam Dong og Bac Kan-provinsene ble vurdert til å være representative for økologisk og forvaltningsmessig variasjon i landet. Mens Lam Dong er dominert av avskoging, øker skogdekket i Bac Kan. For å besvare forskningsspørsmålene benytter studien seg av tverrfaglige metodologiske og konseptuelle rammeverk, herunder institusjonell teori, politisk økologi og levekårs-teori (*livelihood framework*). Den refererer også til den såkalte overgangsteorien i skogdekke (*forest transition theory*) som et rammeverk for å forstå narrativer knyttet til skogutvikling og -politikkreformer. Resultatene fra studien kan ha viktige implikasjoner for innovative skog- og miljøpolitiske rammer som for eksempel *betaling for økosystemtjenester* (PES) og *reduerte utslipp fra avskoging og skogforringelse* (REDD+).

Resultatene viser at 'innovativ' miljø- og klimapolitikk, slik som PES og REDD+, sannsynligvis ikke representerer paradigmeskifter i skogforvaltningen i Vietnam. Som et resultat av institusjonell reproduksjon og såkalt "stivhengighet" er det høy risiko for reproduksjon av allerede eksisterende tilnæringer. Større historiske politiske reformer, som politisk uavhengighet og kollektivisering av landbruket, som forekom etter andre verdenskrig, etterfulgt av markedsliberaliserings- og desentraliseringsreformer fra slutten av 1980-tallet, ble funnet å være de mest grunnleggende forklaringsfaktorene for arealbruksendringer og skogforvaltning i nyere tid i Vietnam. Endimensjonale (*reduksjonistiske*) forklaringsmodeller, som ofte er iboende for PES og REDD+, risikerer å overse kompleksiteten og de underliggende dimensjoner ved arealbruksendring blant skogbruksbaserte husholdningsøkonomier. Samspillet mellom komplekse institusjonelle faktorer og interessene til ulike aktører skaper det vi i studien kaller institusjonelle *bricolages*. Disse bidrar til å modifisere, omdanne og tilpasse nye forvaltningsprogrammer og -ordninger til lokale forhold og institusjoner.

Avhandlingen inkluderer fire uavhengige, men samtidig relaterte artikler som tar for seg ulike aspekter ved implementering av politikk og dens effekter:

Artikkel 1: En analyse av PES-transformasjoner og implikasjoner for REDD+ i Vietnam

Artikkelen analyserer transformasjoner av markedsinspirerte miljøpolitiske programmer, eksemplifisert gjennom implementeringen av PES i Vietnam. Artikkelen bruker kritisk institusjonell stivhengighetsteori (*critical institutional path dependency*) til å analysere institusjonell reproduksjon i PES-politikkens møte med aktører og institusjoner på ulike geografiske nivåer i landet. Her kom ikke PES-politikken inn i et institusjonelt vakuum, men ble transformert gjennom en reproduksjon og modifikasjon av allerede eksisterende institusjonelle strukturer. Dette gjenspeiler ikke bare etablerte normer og verdier om "beste måter" å organisere skogforvaltning på, men også eksisterende strukturer av makt, eiendomsforhold og enkelte gruppers kontroll over ressurser. Fra et stivhengighetsperspektiv representerte derfor ikke PES et "kritisk skille" i skogforvaltningen i Vietnam. Resultatene fra studien kan ha viktige implikasjoner for lignende tiltak, som for eksempel REDD +, både i Vietnam og andre steder. Fremtidige ordninger for PES og REDD+ bør i større grad ta i betraktning de begrensningene og utfordringene institusjonell reproduksjon og stivhengighet representerer i både planlegging og implementering.

Artikkel 2: Subnasjonale overganger i skogdekke (forest transitions) i Vietnam

Denne artikkelen undersøker og sammenligner sammenhenger mellom såkalte *overganger i skogdekke* (FT) og politiske reformer i Bac Kan- og Lam Dong-provinsene i Vietnam. Vietnam har tilsynelatende vært i stand til å fremskynde FT-stadiene ved å raskt bevege seg inn i en positiv trend med netto økning i skogdekke. Dette gjør Vietnam til et interessant eksempel siden FT-rammeverket er en viktig premissleverandør for både global skogpolitikk og -forskning. Funnene tyder på at skogtrender og sosioøkonomiske forhold på subnasjonale nivåer ikke nødvendigvis er sammenlignbare og kompatible innenfor FTs analyserammeverk. Samtidig som Bac Kan er en av de fattigste provinsene i landet, har likevel ekspansjon av skogareal vært en dominerende trend de siste 20-30 årene. Til sammenlikning har Lam Dong-provinsen både høyere bruttonasjonalprodukt og befolkningsnivå, men har likevel hatt høyere nivåer av avskoging, særlig knyttet til utvidelsen av kommersielle flerårige vekster (som kaffe, te og gummi). Dette står i motsetning til hva som kan forventes ut fra konvensjonelle FT-hypoteser om sammenhengene mellom økonomisk og demografisk utvikling, og skogdekke. Analysene viser at vendepunkt knyttet til FT og arealbruksendringer heller er knyttet til større og overordnede politiske skifter, først i forbindelse med avkolonisering, statlig planlegging og kollektiviseringspolitikk på 1950 og 60-tallet, og senere knyttet til "markedsstyrt sosialisme", desentralisering og landreformer sent på 80- og tidlig 90-tallet. Funnene viser at politikk kan overstyre typiske overganger i skogdekke. Dette kan synes positivt, i den forstand at disse overgangene i skogdekke ikke er uunngåelige. Politikk kan utgjøre en forskjell, som vist i Vietnam. Likevel har ikke disse prosessene primært vært styrt av skogforvaltningshensyn, men heller et resultat av generell politikk og samfunnsutvikling.

Artikkel 3: Hvordan adresseres levekår og arealbruk i miljøpolitikken i Vietnam? En case-studie av planlegging og implementering av PES og REDD+ i Lam Dong-provinsen

Denne artikkelen utfordrer oppfatninger (*narrativer*) om drivkreftene bak avskoging i REDD+-politikken i Lam Dong-provinsen i Vietnam. Artikkelen kritiserer endimensjonale forklaringsmodeller både i konkret politikk og i politikkdiskurser om drivkreftene for avskoging og skogforringelse i provinsen. Diskusjoner rundt avskoging i Lam Dong er ofte knyttet til fattige etniske minoriteters såkalte 'ikke-bærekraftige praksiser' og deres utvidelse av kaffeproduksjon (og annen landbruksvirksomhet) i nye skogområder. Artikkelen tar i bruk et levekårsrammeverk (*livelihood framework*) for å diskutere sammenhengene mellom levekår og arealbruk blant husholdninger i to lokalsamfunn i provinsen. Resultatene viser ingen klare sammenhenger mellom fattigdomsnivå og avskoging. Faktisk viste den laveste inntektsgruppen seg å avskoge minst. Eksisterende fattigdomsorienterte og 'etniske' tilnærminger til PES og REDD + synes derfor ikke tilstrekkelige til å kunne løse de mer underliggende årsakene til arealbruksendring i området. Artikkelen anbefaler at tiltak i større grad baseres på helhetlige sektoranalyser av de underliggende kreftene relatert til kaffeproduksjon og arealbruk for øvrig i regionen. Å forsøke å løse problemer knyttet til landrettigheter og tilgang til produktivt areal, og å skape alternative inntektskilder, synes å være viktige elementer i politikkutforming. Bærekraftige tilnærminger for å redusere avskoging og skogdegradering kan være mulig ved å inkludere alle aktører, også de mer velstående og markedsorienterte husholdningene som i stor grad også kontrollerer kaffehandel og eiendomstransaksjoner i området.

Artikkel 4: 'Dyrking av skog': En undersøkelse av produksjonsmangfold i skog i Nord-Vietnam

Artikkelen utfordrer dominerende oppfatninger knyttet til skillet mellom skog og landbruk i politikk og forskning i Vietnam. Slike dikotomier er ikke unike for Vietnam, men gjennomsyrrer hele den globale klima- og skogdebatten. Dette innebærer en oppfatning om at skog har en høyere verdi stående enn hugget, og at landbruk, skogvern og bærekraftig skogbruk er gjensidig utelukkende aktiviteter. Studien er basert på en undersøkelse utført i Bac Kan-provinsen i Nord-Vietnam, og bruker et levekårsrammeverk til å undersøke produksjonsmangfold og bruk av skog blant hushold i området. Eksempelet viser kompleksiteten av tilpasninger til politikk og økologiske forhold, og at husholdninger i ulike institusjonelle og agroøkologiske kontekster skaper og bruker landskap i et kontinuum hvor grensene mellom hva som er 'skogbruk' og hva som er 'jordbruk' ofte er uklare. Funnene om produksjons- og tilpasningsmangfold kan ha viktige implikasjoner for global klima- og skogpolitikk, som for eksempel for REDD + og REALU (*reduerte utslipp fra all arealbruk*). For å nå målene om reduserte klimautslipp fra skog og skogdegradering, samt økt binding av karbon gjennom ekspansjon av skog, må politikere og andre beslutningstakere involvere mennesker og lokalsamfunn, og ta sosiale institusjoner og landbrukspraksiser i betraktning i kontekstspesifikk og tverrsektoriell politikkutforming.

Studien konkluderer med at dominerende REDD+-diskurser, her referert til som 'økologisk modernisering' (*ecological modernization*) og 'grønt styresett' (*green governmentality*), implisitt ofte innebærer endimensjonale forklaringsmodeller for drivkreftene bak arealbruksendring. Med andre ord, i REDD+ er det en iboende logikk å identifisere aktører som enten må kompenseres for å la være å kutte ned trær eller støttes finansielt i å plante nye. I virkeligheten innebærer imidlertid utvikling og implementering av skogpolitikk ofte svært komplekse prosesser, påvirket av flere sett med institusjonelle og agroøkologiske faktorer. Politikimplementering og arealbruksendring knyttet til småbønders levekår er særlig komplekse og dynamiske, og er påvirket av institusjonelle strukturer og aktører med ulike interesser og agendaer. Behovet for en mer bærekraftig forvaltning av tropiske skoger synes ubestridelig. Å gjøre REDD + og annen skogpolitikk mer effektiv og rettferdig innebærer imidlertid at det i større grad tas hensyn til ulike aktørers interesser og til institusjonelle kompleksiteter nasjonalt, regionalt og lokalt.

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PART I:
Synthesizing Chapter

1 Introduction

1.1 Context and background

“Through effective measures against deforestation we can achieve large cuts in greenhouse gas emissions - quickly and at low cost. The technology is well known and has been available for thousands of years. Everybody knows how not to cut down a tree” (Stoltenberg 2007).

Tropical deforestation has been a global concern for decades. Tropical forests are considered to be key reservoirs of a variety of commercial and livelihood resources and of biodiversity values of global concern and interest. More recently, the role of tropical forests in controlling the global balance of greenhouse gases (GHG) by storing and capturing carbon, has been high on the agenda in international negotiations. Recent estimates of the contributions of deforestation and forest degradation to GHG emissions are around 13% (Le Quéré et al. 2014). At the 13th Conference of the Parties (COP) in Bali, December 2007, the idea of Reduced Emissions from Deforestation and Degradation (REDD+) gained momentum, illustrated by the above statement from that conference by the Former Prime Minister of Norway, Jens Stoltenberg. At that time, REDD+ policies and measures were presented by many as a form of ‘low-hanging fruit’ in terms of achieving quick and low-cost results in reducing GHG emissions. This optimism was further fueled by the seminal Stern Report, which analyzed various scenarios and costs of mitigating climate change. The report presented deforestation as a low-cost climate change mitigation option (Stern 2006), a notion that was further strengthened by Eliasch’s review of financing and mechanisms for sustainable forest management and the reduction of global deforestation (Eliasch 2008).

Over the years, the concept and content of REDD have evolved. The ‘+’ was added to capture positive changes within forests in terms of reforestation and afforestation activities (also known as *carbon stock enhancement*), and sustainable forest management. Adding the ‘+’ was seen by many as particularly important for achieving poverty reduction, and linking conservation, climate change and development (Ravindranath, Murthy, and Samantary 2012).

The REDD+ ‘movement’ led to the establishment of numerous projects and financial mechanisms, as well as the development of national plans, strategies and programs for REDD+. What makes Vietnam a special case in the global picture is that it is one of the few countries that has experienced

a net forest-cover increase over the past few decades (FAO 2011). The process of ‘turnaround’, where the rate of forest regrowth exceeds that of deforestation, is frequently referred to as Forest Transition (FT). FT in Vietnam is often attributed to the government policy initiatives launched in the early 1990s. Due to a perceived environmental crisis at that time, the Vietnamese Government initiated major policy reforms in the form of large-scale reforestation and conservation programs, and tenure reforms (see e.g. Bayrak, Tu, and Burgers 2013).

According to the Vietnamese Government, the increases in forest cover are due almost entirely to large-scale programs of reforestation and afforestation¹ amongst smallholder farmers (McElwee 2004). The rationale put forward in policy documents and discourses is that this contributes both to solving problems of environmental degradation and to providing households with more diversified livelihood income opportunities. Nevertheless, studies and evaluations that have been carried out on the effects of policy measures related to forest planting and conservation reflect mixed experiences (see e.g. McElwee 2004, Nguyen 2006, SNV 2010). The findings indicate that while there have been overall forest-cover increases in the country (FAO 2011), the area covered by natural forests, as well as the quality of forests, have been degrading – that is, negative effects on the biomass and biodiversity of forest landscapes are evident (Holland and McNally 2010). This has been the case particularly in forest rich areas, such as in the Central Highlands, where the expansion of perennial crops, such as coffee, tea and rubber has been identified as a major driver of land-use change and forest-cover loss. These effects are frequently linked to smallholders’ (often ethnic minority) livelihood-oriented activities (e.g. DARD 2014).

In order to deal with the various challenges, policy approaches such as REDD+ and Payments for Environmental Services (PES) have been included in the forest management policy ‘toolbox’. PES is based on the simple idea of buyers compensating providers of environmental services for managing the resources at stake sustainably (Wunder 2005). PES has been tested out in two provinces, and was scaled up in 2010 to a national level program.

Vietnam has also developed a REDD+ program based on a national implementation strategy. REDD+ implementation is still at the planning stage, with some scattered testing activities

¹ *Reforestation* refers to the re-establishment of forests after temporary conditions of less than 10% canopy cover, while *afforestation* is the conversion of other land uses into forests (FAO 2012).

occurring in some locations. The approaches and impacts vary, however, between different agro-ecological and socio-economic contexts.

Few systematic, site-specific studies of the drivers of forest cover change have been carried out in Vietnam. Key policy documents and other reports and studies tend to point towards the links between rural poverty and the destructive expansion of agricultural activities into forest areas (SRV 2007, Enright 2012, DARD 2014). Other studies point towards other, more historical and political factors, including government-led logging activities and large-scale migrations of people to forest-dense areas in order to gain political control and generate income from natural resources (De Koninck 1999, McElwee 2016).

1.2 Objectives of the study

The main objective of the study is to explore forest-sector policy development and its interactions with livelihoods and land-use processes at multiple scales and contexts in Vietnam. The study has been concerned with both the negative and the positive aspects of forest-cover change. The overall stance taken implies a view of policy planning, implementation and accompanying land-use change processes as taking place in *open systems*, that is, a view of phenomena of the worlds being multiplicity of causal structures and mechanisms making it difficult to predict policy planning, outcomes and effects (Bhaskar et al. 2010). The study further discusses the implications in this context for practical policy planning and implementation.

In order to address the issues at stake, the study applied a broad range of theories, including institutional theory, livelihood approaches, land-use change theory and political ecology. The study is comparative in the sense that it explores the livelihoods and policy implications in two different contexts, namely the Lam Dong and Bac Kan provinces. These locations were selected since they represent areas that are in different phases of FT, namely net forest-cover losses (deforestation/degradation in Lam Dong) and net forest gains (reforestation/afforestation in Bac Kan).

The four main research objectives of the study are addressed in the respective four articles published during the course of the study:

1. To advance knowledge about the complexities of developing and implementing new environmental policy schemes (regimes), taking the case of forest PES in Vietnam.

2. To investigate to what degree the FT policy approach framework is useful for understanding regional forest cover dynamics and policy approaches in Vietnam.
3. To explore policy assumptions about the interlinkages between livelihoods and land use, and poverty oriented explanation models of the driving forces of forest-cover change in the Lam Dong province.
4. To explore the role of forest land in household livelihood adaptive strategies in a reforestation zone in the Bac Kan province.

1.3 Structure of the thesis

The thesis consists of four independent papers that investigate the respective research objectives. The purpose of this Synthesizing Chapter is to present a coherent conceptual, methodological and contextual framework in which the overall results and analyses can be understood in a more comprehensive manner. Specifically, this part presents more details on the theories, field study area and methods than was possible in the journal-based format of the individual papers.

The remainder of this ‘Introduction’ part of the thesis is organized as follows: Since the study was conducted within a REDD+ framework, Section 2 presents a detailed review of REDD+, its theoretical foundations, its position within the global environmental and climate discourse, and concerns that have been raised within the debate. The section also provides details on the specific REDD+ activities and mechanisms that apply in the Vietnam context. Section 3 presents the conceptual framework, and the theories that underpin the study as a whole and the respective papers. Section 4 presents the context of the study, including key characteristics of Vietnam, and its history of political and forest sector reforms. Section 5 deliberates on the methodological approach of the study, including the rationale for the selection of the case study provinces, villages and households for the livelihood survey, and interviewees for the semi-structured interviews. The section also includes background information about the case study provinces, and presents key challenges and obstacles encountered during the fieldwork. Finally, Section 6 presents summaries of the respective papers, and discusses the overall results in the light of the conceptual framework.

2 Forests, climate and REDD+

The study examines forest sector policies in Vietnam from the early 1990s onwards. The rationale was to identify important experiences and potential lessons learned from forest conservation and forest enhancement activities carried out in Vietnam that could be of relevance for emerging second generation policy mechanisms and approaches, such as REDD+ and PES. In particular, REDD+ is a key reference point as a predominant (discursive) policy framework in the study, even though in Vietnam it has been in the planning and testing stage since 2009.

This section details the basic principles and ideas of REDD+ that are considered relevant for the study. This includes an elaboration of the evolution of REDD+ and underlying conceptualizations of the dynamics of forest-cover change, including FT and the framework of direct (*proximate*) and indirect (*underlying*) drivers of deforestation and degradation (and forest stock enhancement). The section introduces the major REDD+ (financial) mechanisms, ongoing activities, and actors, and lastly, offers some reflections around environmental governance discourses on the main challenges in relation to realizing REDD+ globally, nationally and in local contexts.

2.1 Conceptualizing REDD+

The perceived linkages between forests, forest management and climate change are not new ideas (Giacomelli 2016). In the global environment debate, conserving tropical rainforests for saving the climate and storing carbon can be traced back to the 1980s at least, and the World Commission on Environment and Development's report *Our Common Future* (WCED 1987). Conserving tropical rainforests for mitigating climate change was already on the agenda during the Kyoto Protocol negotiations at the Conference of the Parties (COP 3) in Kyoto in 1997; however, at that time the establishment of a global mechanism, including a system for monitoring results and releasing payments, was considered to be too complicated and not technically feasible. Reducing emissions from *agriculture, forestry and other land uses* (AFOLU) was, however, included as a voluntary option for individual countries to consider as a possible mitigation strategy. In addition, in the Clean Development Mechanism (CDM) of the Kyoto Protocol, the possibility of developing afforestation and reforestation (A/R) emission reduction projects was included as a way forward for developing (non-Annex 1) countries.

In 2005, the Coalition of Rainforest Nations re-introduced the idea of including carbon credits for reduced deforestation (RED). At the COP 13 in Bali in 2007, the first substantial decision to include tropical forests in the United Nations Framework Convention on Climate Change (UNFCCC) was made in the so-called *Bali Action Plan*. Since then, the RED concept has evolved to include forest degradation (REDD), and sustainable management and enhancement of forest carbon stocks (REDD+). The development of the REDD+ concept strongly reflects different perspectives and interests in climate change negotiations. The second ‘D’ mirrors the interests of countries that have little deforestation but more degradation (e.g. logging in the Democratic Republic of Congo); and the ‘+’ mirrors the interests of countries in the process of expanding forest areas either by natural regrowth or by planting new trees (e.g. China, India and Vietnam).

While REDD+ is still not much more than a conceptual idea, its influence on policies and global forest conservation discourses over the past decade should not be underestimated. The core underlying idea of REDD+ is to reward individuals, communities, projects and countries that reduce GHG emissions resulting from deforestation and degradation (Angelsen 2008). In this sense, REDD+ is highly influenced by the concept of Payments for Environmental Services (PES). REDD+ could in many ways be regarded as the largest-scale global experiment of PES (Corbera 2012). In simple terms, conventional perceptions characterize PES as voluntary and performance-based market transactions between buyers and sellers of clearly defined environmental services (Wunder 2005). In the case of REDD+, the services are carbon stored in existing forests, and/or the promotion of carbon stocks in forests by natural regrowth or the intentional planting of new trees. REDD+ clearly implies commodification of an environmental service, namely the storage and binding of carbon in forests, embodied through Certified Emissions Reductions (CER) to be transacted in (future) global carbon markets. In this sense, the study places REDD+ conceptually within the diverse group of policy approaches labelled as *neoliberal conservation* (e.g. Holmes and Cavanagh 2016). Besides reducing GHG emissions, REDD+ was simultaneously expected to deliver co-benefits in the form of biodiversity conservation and improved livelihoods for people living in and depending on tropical forests worldwide.

2.2 Forest Transition and land use change

In relation to forest-cover change, there are two influential conceptual frameworks that need further elaboration, namely Forest Transition (FT) and drivers of land-use change. The importance

of understanding historical and current drivers of land-use change in various countries and contexts has been identified as a field of knowledge that requires further development for effective REDD+ design and implementation (Kissinger, Herold, and Sy 2012, Hosonuma et al. 2012). In analyzing time-specific, contemporary trends, one may distinguish between direct (*proximate*) and indirect (*underlying*) drivers of change (Geist and Lambin 2002). While the science of land-use change is concerned predominantly with relationships between the direct factors – often referred to as the PAT (population, affluence, technology) variables – more structure-oriented theorists, such as political ecologists and critical institutionalists, tend to stress the role of exogenous processes that often operate to the disadvantage of local communities (Turner and Robbins 2008), such as for example global commodity markets.

Drivers of land-use change can take the form of power relations, institutional changes in management and resource regimes, or shifts in market governance and risk arrangements. While it is somewhat straight forward to detect the direct (*proximate*) causes of deforestation and degradation in many places – ranging from the expansion of small-scale farming, commercial plantations or logging of timber (legal and illegal) – understanding the *underlying* factors is more complex. Nevertheless it is crucial to develop a comprehensive understanding of the underlying factors in order to develop efficient policies and measures to deal with the issues at stake (Hansen, Lund, and Treue 2009).

Discussions about the drivers of land-use change are not new, and in this sense, the REDD+ debate feeds straight into historic and on-going discussions about who the actors are regarding environmental change and degradation in national and sub-national contexts. How the drivers of change are defined and emphasized in such discussions are often normative, reflecting social aspects, power struggles and control over natural resources by dominant groups within societies (Robbins 2012, McElwee 2016). Such discourses about environmental change have implications for the development and implementation of land-use policies and measures on a practical level (McElwee 2016).

The FT framework is frequently applied in policy making and research studies, particularly in analyzing forest-cover changes over time. This framework was first introduced as a concept by Mather (1990), and it has since become widely accepted across disciplines as an empirical regularity (Robbins 2012). In short, FT demonstrates that forest-cover change takes place in

predictable stages, and is often associated with the type of thinking evident in Kuznets curve of economic development (Perz 2007). FT postulates that forest-cover change is linked to population growth and economic expansion. During early periods of commercialization and population growth, deforestation increases and forest cover starts to decline. Later, as industrialization becomes more prevalent, the constellations of social and economic forces change, and the more marginal agricultural lands are abandoned and revert to forests. At some stage, reforestation and afforestation become more prevalent than deforestation, and forest cover will consequently start to increase again (Rudel 1998). It is this process and ‘turnaround’ that is characteristic of ‘forest transition’ (Fig. 1).

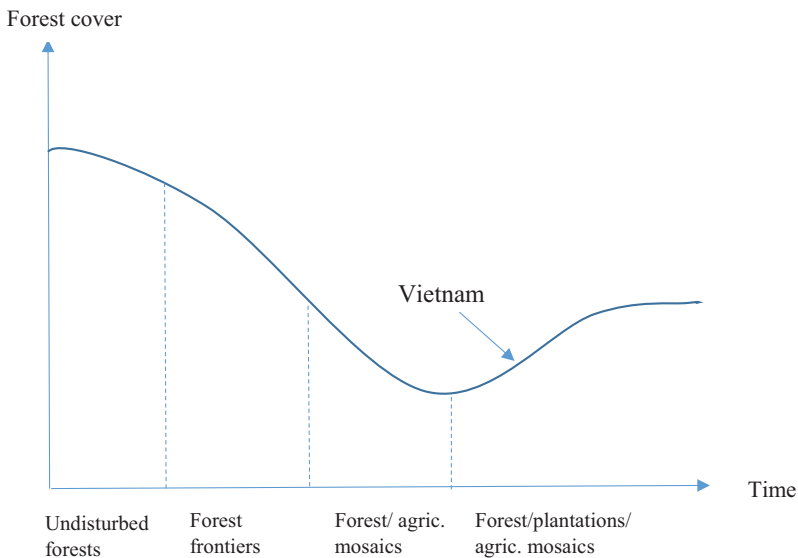


Figure 1. FT and its phases of development, and the presumed position of Vietnam on the curve (adapted from Angelsen and Rudel 2013).

FT is often linked to two main predictors of land-use change, namely *land rent* and *forest scarcity* (e.g. Rudel et al. 2005, Angelsen 2007). In short, increasing agricultural returns (*land rents*) will, in the early phases, be a dominant driving force agricultural expansion into forest land. With continued economic development, non-farm employment opportunities and urbanization trends will cause increased labor and production costs, and decreasing land rents. As forest cover

decreases, forest products become scarcer and their value will consequently increase (*forest scarcity*), creating additional incentives for forest regrowth and planting new trees.

FT has become influential both as an analytical framework for understanding forest-cover change and as a reference point for policy making. With regard to the latter, FT can be used as a model for reconstructing historical trends, for developing credible baselines or reference levels REL/RL (Meridian 2011), and also as a framework for understanding the effects of policies in countries and contexts that are in different stages of FT. FT has furthered perceptions about policy designs that can change the ‘trajectories’ of forest-cover development (Angelsen and Rudel 2013). In this sense, FT has become an influential framework for conceptualizing the trajectories and drivers of forest-cover change within REDD+. This study investigated the degree to which FT is a useful framework for analyzing the dynamics between policies and land-use change at sub-national levels in Vietnam.

2.4 Developing and implementing REDD+

The realization of REDD+ globally has been slow. As the pace of the climate change negotiations slowed down, the willingness to pay for REDD+ waned, and the complexity of implementing REDD+ programs dawned (see e.g. Hansen, Lund, and Treue 2009, Corbera and Schroeder 2011, Angelsen et al. 2012). More realistic expectations then evolved about what could be achieved and at what speed. The practical implementation and testing of REDD+ has developed in a myriad of directions and approaches, ranging from national-scale implementation in countries like Brazil and Guyana, to small-scale local-level NGO pilots of various kinds and in various places (Angelsen et al. 2012). A particular trait of REDD+ has been its ‘aidification’, with the major bulk of funds coming from development assistance donors (Angelsen 2016). Nevertheless, the COP 21 Paris Agreement signed in December 2015 spurred new optimism in terms of the prospects of realizing REDD+, including generating substantial financial resources, developing clearer guidelines for implementation, providing more accurate data, and scaling-up activities (Harris and Stolle 2016).

Multiple interim mechanisms and initiatives have been developed to feed global REDD+ processes with knowledge and practical experiences. These include, *inter alia*, the establishment of several multi-donor trust funds, such as the UN REDD Programme (UN REDD), the World Bank Forest Carbon Partnership Fund (FCPF), and the Forest Investment Programme (FIP). Bilateral agreements have been signed between tropical forest countries and developed donor countries, and

numerous NGO initiatives have been launched. While concrete examples of national level accounting and performance-based REDD+ are scattered, a few countries such as Brazil and Guyana have played key roles in the global arena with approaches of dealing with deforestation and implementing country-scaled REDD+. NGOs have led the way in developing practical REDD+ pilot projects, and in promoting various advocacy-related topics within the global REDD+ debate.

A common objective of global REDD+ trust funds is to support countries in their efforts to attain REDD+ ‘readiness’, that is, developing institutions, strategies and capacities to implement fully fledged performance-based REDD+. The idea behind this is that countries are in different stages of readiness, categorized into three main phases. Phase 1 is characterized by strategy development and capacity building; Phase 2 involves concrete implementation of policies and measures; Phase 3 is full-scale REDD+ implementation (Meridian 2009). Since 2008, more than 60 countries, including Vietnam, have received support for readiness through various funding mechanisms. Vietnam has received support from the UN REDD Programme and the FCPF Readiness Fund since 2009. The FCPF includes a Carbon Fund (FCPF-CF), which is most likely the closest to a global funding mechanism for verified emissions reductions. Currently 18 countries are being considered for results-based payments from the FCPF-CF, including Vietnam.

2.3 REDD+ discourses and key challenges

The analytical framework of Bäckstrand and Lövbrand (2006) categorizes governance discourses on climate change mitigation into three sub-groups: *ecological modernization*, *green governmentality* and *civic environmentalism*. In addressing the challenge of tropical deforestation, these categories are useful for systematizing the various directions of REDD+ and views of actors with different interests.

2.3.1 Ecological modernization

Discourses on *ecological modernization* (EM) are rooted in the Brundtland report *Our Common Future*, and include the compatibility of economic growth and environmental protection, liberal markets, and sustainable development. In a way, the EM story of compatibility between growth and environmental protection is compatible with the FT view of the positive interlinkages between socio-economic development and forest-cover change. The EM school is also where the storyline

of REDD+ as a ‘low hanging fruit’ – a win-win solution and low-cost option for mitigating climate change – is located.

The main proponents of EM are in the JUSCANZ group of member countries within the UNFCCC (Japan, USA, Switzerland, Canada, Australia, Norway and New Zealand), but the philosophy has also been embraced by multilateral organizations such as the World Bank and the United Nations Food and Agriculture Organization (FAO). The idea builds upon a strong belief in innovative technologies, the changing roles of governments towards more ‘flexible, decentralized, cost-effective and collaborative policy-making’ (Bäckstrand and Lövbrand 2006:53), and a global ‘cap and trade’ market-based system.

2.3.2 Green governmentality

The *green governmentality* (GG) discourse goes alongside ecological modernization in the climate change debate. It reconfirms a strong belief in the powers of the modern administrative state, scientific knowledge and large businesses. The strong emphasis on the role of governments and scientific knowledge makes it, in one sense, less democratic than the ecological modernization discourse. The main proponents of GG can be found within science and policy elites, and within the Intergovernmental Panel for Climate Change (IPCC).

In relation to REDD+, the manifestation of GG is particularly pronounced amongst the proponents of ‘credible’ systems for measurement, reporting and verification (MRV), REL/RL and phased REDD+ readiness approaches (Martin and Margaret 2011). By making use of earlier studies of forest-cover dynamics, careful planning and implementation, trajectories of future scenarios and forest cover can be detected. As a result, in order to achieve effective MRV, numerous countries, including Vietnam, have embarked upon processes to increase capacities and invest in technologies for remote sensing of forest cover. In order to enhance effective measurements and results-based REDD+ payments, there is a pronounced focus in the global REDD+ policy debate and readiness efforts on establishing credible REL/RL against which results can be measured (Meridian 2011). In this sense, the GG perspective is also highly compatible with and, many would say, influenced by the ideas of FT.

Even though the EM and GG discourses in many ways go hand-in-hand in the global climate change debate and negotiations, there is still an inherent tension between the former’s belief in the markets and flexibility, and latter’s focus on careful planning and streamlined procedures of

implantation/implementation, measurements and verification of results. With REDD+ there has been even more flexibility and crossing of lines between and within mainstream proponents of the various discourses. This also applies to the last category of discourses, namely civic environmentalism.

2.3.3 Civic environmentalism

The *civic environmentalism* (CE) discourse is characterized by the language of ‘participation’, ‘stake-holding’ and ‘democratic efficiency’. It highlights the role of civil society organizations in pursuing the objective of sustainable development, and filling the ‘participation’ gap in the global environmental debate. Here the inclusion of marginal groups, such as women, youth and indigenous peoples, is a key aspect. This discourse also points to the inherent north-south inequality and injustice perspective, and the risk of reinforcing this gap through global environmental negotiations and agreements. It supports more holistic analyses and solutions to the challenges of global deforestation.

This discourse is where one finds voices most critical of REDD+. These include, *inter alia*, the importance of solving issues related to land tenure and the rights of indigenous peoples regarding forests, and the risk of REDD+ reinforcing inherent structural injustices in many countries (e.g. Cotula and Mayers 2009, Campbell 2009, Larson, Brockhaus, and Sunderlin 2012). The critique includes risks related to the environmental and biodiversity integrities of forest ecosystems (e.g. Harvey, Dickson, and Kormos 2010). The influence and position of CE perspectives in the REDD+ debate and negotiations is illustrative of the movement and crossing of lines of perspectives between ‘conventional’ proponents of the various discourses. Within the World Bank FCPF and the UN REDD Programme mechanisms, who normally would be associated with ME and GG perspectives, the language of ‘participation’ and *free, prior and informed consent* (FPIC) has, for example, become entrenched in their policy guidelines. The influence of civic environmentalism in the UNFCCC negotiations is visible in the adoption of the FPIC principles in the text of the agreement.

The Bäckstrand and Lövbrand (2006) framework demonstrates the importance of discursive processes and perspectives in policy negotiation and design processes, which in turn have implications for practical implementation on the ground. The framework was developed mainly for global-level climate negotiations, but is also relevant for lower-scale policy processes. In

relation to REDD+, the argument followed in this study is that, closely following the logics of EM and GG, policies tend to be dominated by one-dimensional explanation (causal) models and the need to identify clearly defined ‘agents of change’.

In a sense, this study positions itself more towards CE, and the need to take account of the complexities of livelihoods and land-use processes by including multiple stakeholders and interests in policy planning and implementation. The main argument is that in terms of practical planning, design and implementation, policy goals and measures will be transformed by actors within various types of institutional contexts. The study applies environmental governance and institutional path dependency frameworks to explain how policies in Vietnam are transformed during planning and implementation processes into approaches resembling existing policies (see Section 3.2 below).

3 Conceptual framework

While REDD+ and FT represent key reference points and overall conceptual policy models for the study, this section discusses other major theoretical and analytical concepts considered relevant for the research. Before I turn to the concrete theoretical frameworks used in the various papers to explore their respective research objectives, I reflect briefly upon the ontological and epistemological position of the study.

3.1 Critical realism and the dynamics of land-use change

The study was influenced by the philosophy of science tradition – ‘critical realism’ (CR). CR is often associated with the British philosopher Roy Bhaskar, who is considered to be its founder (Collier 1994). It is beyond the scope of the study to make a comprehensive and detailed analysis of CR and its relevance for environmental governance and land-use change theory; however, in short, CR considers events (both natural and social) to be the result of causal laws and (multiple) mechanisms (Jones, Bradbury, and Le Boutillier 2011). The ontological division between the *real*, the *actual* and the *empirical* is crucial. Here the *actual* refers to observable events and outcomes that occur in the world, while the *real* refers to the underlying relations and structures (mechanisms) that have the power to cause changes in the *actual* realm. The *empirical* denotes human perspectives (and theories) about the world, including both the *actual* and *real* domains (Collier 1994).

Social constructivism refers to a broad range of positions viewing knowledge and reality as actively created by social relationships and interactions. From a CR perspective, radical constructivism is considered wrong in its ignorance of ontological questions, and in this sense, CR takes a mid-position in its ontological view of social constructions – such as discourses (of policies and politics) – having real-world causal powers (Elder-Vass 2012).

Relating this philosophy to the study of forest-cover change and the dynamics of the drivers of change, the *actual* refers to observable events of forest-cover change on the ground, i.e. forest that has either been lost (cut, burned, etc.) or regrown (planted or natural regrowth). The *real* encompasses both the direct and underlying drivers (mechanisms) of forest cover change. The *empirical* then refers to various human observations and interpretations (or constructions) of the causal factors behind these changes, which in turn may have implications for how policies are

conceived, designed and implemented in order to address the issues at stake (Fig. 2). FT would, for instance, represent such a human conceptualization of the dynamics of forest-cover change. Notions about the causal linkages between, for example, poverty, population growth and environmental degradation may represent other ‘simplified’ perspectives.

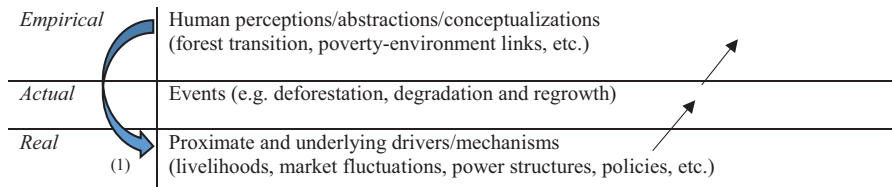


Figure 2. CR framework for analyzing drivers and theories of forest-cover change (adapted from Sayer 2000:15).

The critical realism framework is therefore relevant when studying the relationships between the proximate and the underlying drivers of land-use change. The world consists of concrete events, such as deforestation, degradation and reforestation (the *actual*), but also of objects and mechanisms that exist independently of our knowledge about them, with the inherent power and possibilities to create events (the *real*) (Sayer 2000). These mechanisms or powers are not necessarily visible, and could be place-endemic, or originate within wider structures, such as the global commodity market, institutional structures, or power relations at multiple scales. And importantly, the human perceptions, conceptions and constructions (e.g. about the drivers of deforestation and land-use change) at the empirical level are likely to feed back (Fig. 2 – arrow (1)) to the *real* and influence the mechanisms of change, for instance, through policies and markets. From a critical realist perspective, therefore, environmental governance studies should explore how empirical observations could potentially enable ‘inferences about the nature of the *real* social structures, such as the broader social, economic, and political drivers of environmental phenomena’ (Cavanagh 2012:76).

Throughout this thesis, I make the case that policy designs and discourses around the mechanisms and drivers of forest-cover change are frequently one-dimensional and broad-brushing, often failing to take location-specific and contextual socio-economic factors into account. A simple and banal example of such a one-dimensional perspective is the former Norwegian Prime Minister

Stoltenberg's quote presented earlier, namely that 'we all know how not to cut down a tree' from his speech at the 13th UNFCCC COP in Bali in 2007. Such perspectives can also be traced in many policy and research documents, but are often wrapped inside climate change and REDD+ discursive languages and terminologies, including *environmental modernization* and/or *green governmentality*. Even though readiness programs and documents underline the complexities of deforestation processes (the proximate and underlying dimensions) in specific countries and sub-regions, they frequently fail to take into account the more subtle and unpredictable aspects of land use and land-use policy dynamics.

Petter Næss (2010) claims that climate change research and policy making are being dominated by simplified discipline constructions of climate systems and mechanisms. He refers to this as 'CO₂ reductionism' or 'tunnel-visions'. Applying this to the REDD+ and forest-cover debate and discourses, the FT 'land-/forest rent' dichotomy could also be said to represent a kind of 'reductionism' in terms of its understanding of forest-cover dynamics and 'transitions'.

In this study, I claim that an inherent logic of REDD+ is the notion that land-use change processes are attributable to identifiable 'agents of change' (Forsyth and Johnson 2014). That is, land-use change processes, such as deforestation, the expansion of trees and fallowing of land – decisions made by individual actors, such as farmers, households and companies – lead to the loss of forest cover, and in turn to the release of GHG gases. In Vietnam, for example, land-use change processes, including both deforestation and reforestation, are often assumed to be linked to small-scale producers (often the 'poor' and the 'ethnic'), and policies tend to opt for one-dimensional solutions to the problems and issues at stake. This study takes the stance that land use and forest-cover dynamics are context specific, unpredictable and influenced by multiple and multilayered causal structures and mechanisms. Complex phenomena (such as climate change and land-use processes) take place in open systems, and are generated by a multiplicity of causal structures and mechanisms (Bhaskar et al. 2010).

What makes CR well adapted for analyzing complex and open systems, is its view of knowledge as stratified, making it possible to combine different sciences, theories and perspectives to understand the world. For understanding and investigating land-use change, Lambin, Geist, and Lepers (2003) recommend combining *agent-based*, *system oriented* and *narrative* approaches. The agent-based approach relates to land-use decisions made by individuals, the system oriented

approach relates to the organizations and institutions of society, while the narrative seeks to understand the historical and interpretative aspects of land-use change. On an overall level, the already presented *Forest Transition (FT) framework* represents a predominant narrative to be explored in understanding forest-cover change and dynamics in Vietnam. Three other theoretical conceptual/analytical frameworks have been particularly important for this study, including environmental governance theory, political ecology and a livelihood framework. In order to provide more in-depth understanding of the mechanisms of change and to illuminate predominant policy narratives and policy development processes, the study applies an *environmental governance framework*, in what I refer to as ‘critical institutional path dependency’ theory. The livelihood papers (3 and 4) apply theoretical frameworks inspired by *political ecology* (PE) and livelihoods framework theory in their analyses. The *environmental governance* and *political ecology* frameworks are now further elaborated upon.

3.2 Environmental governance: Policies, path dependencies and institutional change

The study has been highly inspired by *environmental governance theory* as outlined by Vatn (2005), whose framework considers the status of natural resources as a result of interlinkages between the resource attributes (e.g. forest cover), institutions (regimes) and the patterns of interaction between actors that result in certain outcomes (resource uses). In a sense, this model also captures the different levels of analyses targeted through the objectives (and papers) in this study (Fig. 3). Objective/Paper 1 is concerned with how policies are transformed and reproduced in the interactions between institutional structures and the actors within them, encompassing levels (II) and (III) in the governance model. Objective/Paper 2 focusses mostly on the interaction between forest cover and policy reforms and implementation (levels (I) and (II)), including perspectives and studies from all levels, by reviewing processes of land-use change in the study contexts. Objectives/Papers 3 and 4 focus mostly on the agents’ (livelihood) choices (III), their patterns of interaction (between themselves and their environment) (IV), and implications for resource and land use (V). The papers use the findings of to illuminate policy discourses found within the institutional domain (II).

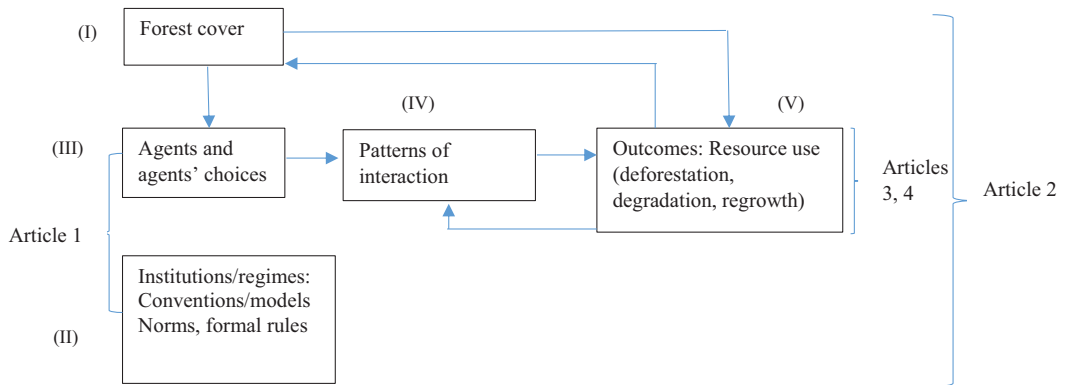


Figure 3. Environmental governance framework focusing on the interaction between resource regimes and resource properties (forest cover), as an organizing framework for the four papers of this study (adapted from Vatn 2005).

Environmental governance theory focusses on the role institutions play as drivers of environmental change. Institutional theory normally applies a broad definition of institutions as “... a set of rules, decision-making procedures, and programs that define social practices, assign roles to the participants in these practices, and guide interactions among the occupants of individual roles” (Young 2002: 5). Institutional theorists are also concerned with power relations in their view on institutions as the result of processes “where powerful actors impose their institutional preferences on the less powerful actors” (Petursson, Vedeld, and Sassen 2013: 24). Here however, I do not view such power processes as uni-directional, and am inspired by scholars such as Mosse (2005) and (Scott 1985, 2009), who, in their own ways, recognize the agency and power of resistance towards change amongst the ‘less powerful’. Similar studies have been carried out in Vietnam by Kerkvliet (2005) on the power of everyday resistance of rural populations in their encounter with communist collectivization politics in the post-colonial era until the mid-1980s. These perspectives are also relevant in the study of institutional processes and populations encountering new forest related policy approaches, such as PES and REDD+.

Policies can be defined as official statements, regulations and laws ‘agreed through political debate and implemented through the bureaucracy’ (Scoones 2015: 56). While political processes

determine the ‘design’ of policies or ‘resource regimes’, ‘it is the actions of the economic actors given these regimes that influence [...] the status of environmental resources’ (Vatn 2011:141). Environmental problems can then be viewed as mismatches (lack of fit) between properties of ecosystems and the attributes of given resource regimes (Young 2002, Vatn and Vedeld 2012).

How resource regimes and policies evolve over time will affect the ‘histories’ – and the physical properties – of landscapes. The concept of ‘institutional path dependency’ assumes that the legacies of past and existing institutional arrangements have implications for how new policies are implemented and produce effects in specific settings and contexts (Mahoney 2000, Petursson and Vedeld 2017). Due to these legacies, norms and values of ‘how to do things’ tend to reproduce themselves, and true change becomes slow and incremental-path dependent. At specific points in time, however, abrupt changes may happen as a result of, for example, institutional or technical innovations. These events represent what the study terms ‘critical junctures’ that lay the foundation for new policy making, institutional development and ‘path dependencies’ for new resource regimes (Fig. 4) (see also Sydow and Schreyøgg 2010).

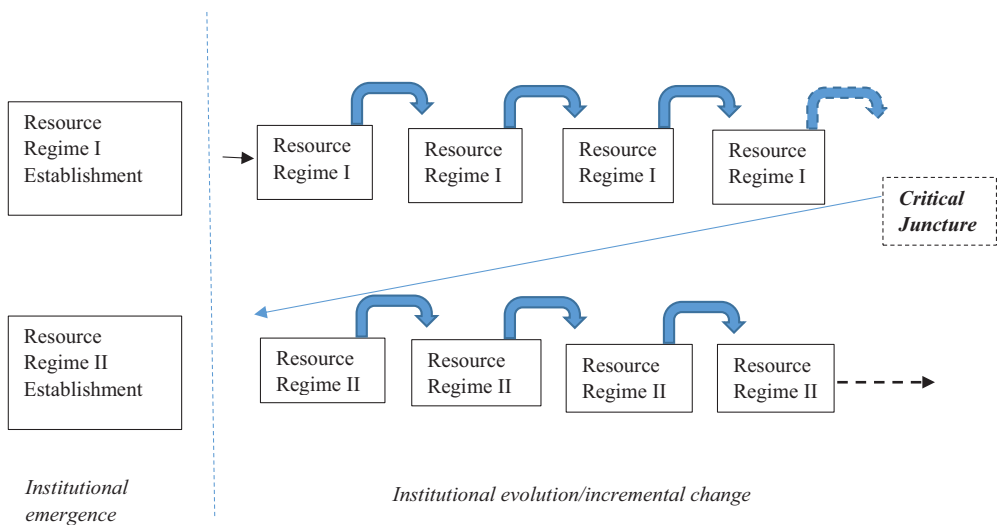


Figure 4. Institutional change/development/bricolage and critical junctures in institutional path dependency (adapted from Petursson 2011: 37).

Applying a framework inspired by critical institutionalism, ‘path dependencies’ and institutional change can also be viewed as a result of the interplay and ‘bricolage’ of interests, norms and value systems of various institutional structures and of the actors operating within them. In line with this approach, the study follows a perspective that, in the encounters with policy measures and institutional reforms, a myriad of adaptations and hybrid forms will most often be the result (Cleaver 2012).

3.3 Political ecology

The study is also concerned with ‘constructions’ and simplifications as presented in policy discourses about forest-cover dynamics and management in Vietnam. The underlying argument is that control of language, meaning and ‘definitions of problems’ have saturated policy making and approaches in dealing with deforestation in Vietnam. The study investigated, *inter alia*, assumptions and simplified policy dichotomies about the role of smallholders in land-use change (and forest transitions) and the links between land categories and presumed patterns of land uses. In analyzing such predominant perceptions about the drivers of forest-cover change, the study found elements from political ecology (PE) useful.

PE is frequently associated with CR, in its mid-position between the ‘real’ and the ‘constructed’ (Forsyth 2003, Benjaminsen and Svarstad 2010). For instance, PE is frequently concerned with how multiple actors, with divergent interests in the ‘truth’ and competing objectives, are involved in negotiating formal policy that, in turn, has implications for the environment and how natural resources are managed on the ground (Blakie 2007). When studying forests and forest-cover change, political ecologists ask questions such as: ‘Who controls the language and normative assumptions of (for instance) how a forest ought to be managed?’, and ‘Whose interests do policy models and approaches serve?’. Some claim, for instance, that REDD+ as a governance framework has become a tool for promoting and legitimizing certain actors and solutions (Thompson, Baruah, and Carr 2011).

The ways in which problems are framed have implications for approaches and solutions to target the issues at stake. What is defined as a forest, for instance, is not trivial or straightforward, and is frequently filled with the potential for differing interpretations, ambiguities, and politics (Wong, Delang, and Schmidt-Vogt 2007). In this sense, policies do not evolve in a void, and as illustrated by numerous scholars, they do not necessarily reflect the complex dynamics of land-use change

processes and landscape dynamics on the ground (see e.g. Dang, Turnhout, and Arts 2012, McElwee 2016). These complexities have often been evident in Vietnam.

3.4 Livelihoods and land use

In order to understand the links between livelihoods, land-use dynamics and policies in local contexts, the study applied a *livelihoods framework* (LF). The essential idea of the LF is that livelihood assets (natural, financial, human and social capital) are combined to form particular livelihood strategies with particular outcomes (which may be sustainable or non-sustainable) (Scoones 1998, Ellis 2000). Sustainable livelihoods are able to maintain capabilities and assets, and to cope and recover from stresses and shocks without undermining their natural resource base (Chambers and Conway 1992).

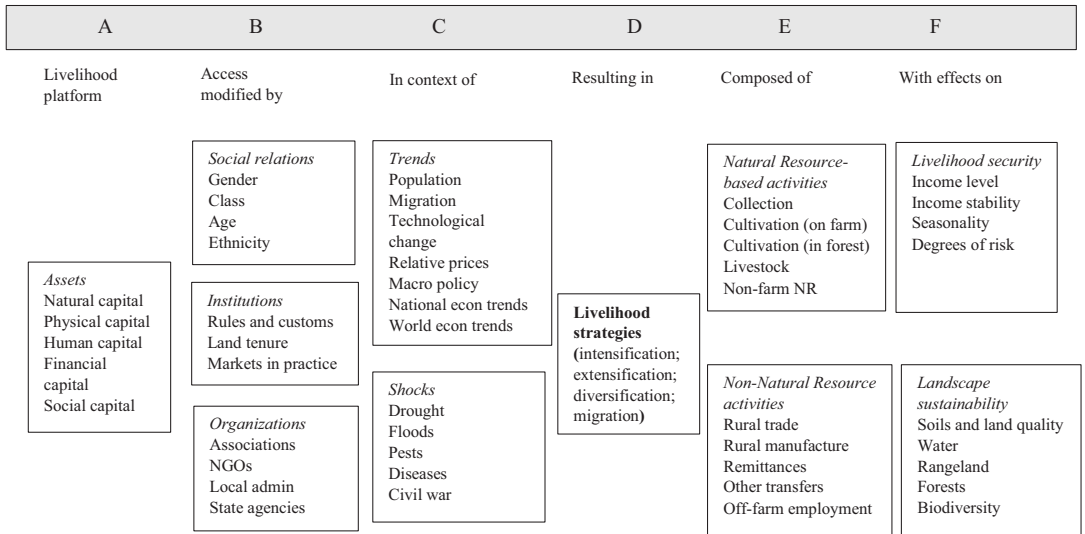


Figure 5. The Sustainable Livelihood Approach (based on Scoones 1998).

The study applies the LF at the household level, assuming that households combine different capitals such as land, labor, and financial, physical and social capitals to generate incomes and form specific livelihood strategies that eventually have implications for – and effects on – landscapes, and other public goods for that matter (Fig. 5). Within the framework there are three broad structures, or options for rural livelihood strategies, namely agricultural *intensification*

and/or *extensification*, *diversification* and *migration* (Scoones 1998). These strategies are all relevant in analyzing livelihoods in the communities that were selected for this study.

Conceptually, in considering livelihood strategies, scholars such as Ellis (2000) (as an economist) and Scoones (1998) (as a sociologist), distinguish between the relative weights put on individual decision-making, and structural limitations of markets, policies and other institutional factors. The contextual and dynamic aspects of livelihoods are central to this study. As expressed by Scoones (1998:12), who tends to focus more on the structural aspects and limitations of livelihood strategies:

Unless we understand the social structures and processes through which sustainable livelihoods are achieved, a description of the relationships between variables and outcomes is somewhat limiting.

Hence I do not see livelihood decisions as being taken purely on the basis of ‘rational’ economic considerations in attempting to maximizing outcomes. Household decision-making is critically influenced, not only by economic considerations and the logics of consequences, but also by social concerns, psychological preferences, and culturally and historically shaped ideas about ‘the right way of doing things’ (Cleaver 2012:15).

In reality, access to resources (livelihood assets) is mediated through (both formal and informal) institutions, for example land rights (both statutory and traditional), markets, schooling systems (human capital), and social networks. Furthermore, livelihoods and livelihood decision-making processes take place in open systems, which are influenced by decision-making processes at multiple scales, and where multiple factors need to be taken into consideration (Scoones 2015). And, importantly, the local and contextual factors change over time, making it crucial to take historical factors into account in analyses of livelihoods (Scoones 1998). In a sense, landscapes are the products of multiple activities and adaptations in space and over time, as described by Leach, Mearns, and Scoones (1999) and conceptualized by Krogh (1995) as ‘landscaping’. In this way, and applying the critical realism terminology of ‘laminated systems’, which “pinpoints the meshing of explanatory mechanisms at several different levels of reality and possible orders of scale” (Bhaskar et al. 2010:ix), we could in a sense talk about ‘laminated landscapes’, being products of their location-specific institutional, social and ecological histories (Arts et al. 2012).

In order to better understand the socio-economic and historical context in which the study was undertaken, the following section briefly presents the geographical background and the history of institutional and forest-sector policy reform in Vietnam.

4 Field study context

The historical, institutional, political and cultural background, and the physical characteristics of Vietnam have been decisive in how farmers and communities have adapted to the implementation of various policy schemes and programs over the years. I therefore start by introducing Vietnam as a country, including its physical, demographic and political characteristics, followed by a review of the history of forest-sector policy reforms.

4.1 Vietnam

Vietnam is a physically and culturally diverse country. It covers an area of 332,698 km², and has a population of 91,703,800 (World Bank 2015). The population consists mainly of people of ethnic Vietnamese (*Kinh*) origin (about 87%), but the country also hosts numerous other ethnic minority groups (about 53 types, according to official figures) (UNFPA 2011). Vietnam was ranked 116 (out of 188 countries) and categorized as a medium welfare-level country on the UNDP's Human Development Index in 2014 (UNDP 2014). Poverty levels vary to a great extent, however, between different parts of the country, and between rural and urban areas.

Today Vietnam is one of the few remaining one-party socialist states in the world. The Communist Party has a key role in state administration at all administrative and governance levels. Centralized planning and high enforcement capacities in politics and administration characterize the governance system. The country consists of 63 provinces that are further subdivided into districts and communes with their own administrative structures. The provinces retain a certain degree of autonomy, for example, in terms of the selection of policy reforms and approaches, and the speed and mode of implementation.

Since 1945, post-colonial Vietnamese history has been characterized by an era of tensions and armed conflicts (with the former colonial power (France), between the North and the South, and the war with the United States), and central-planning (communism). A key trait of Vietnam's contemporary history, has been the state's attempts to bring the various ethnic minority groups in the country 'to heel', and to assimilate them in the Vietnamese nation and culture. Key strategies in this endeavor have been government-led migrations of the majority *Kinh* to the ethnic minority areas (often labelled the new economic zones (NEZ)), combined with forced resettlement schemes

of the minorities to residential areas where they are encouraged to adopt fixed modes of production instead of their traditional shifting agricultural practices (Salemink 2003).

During the past three or four decades, Vietnam has experienced market-led reforms and economic development. The market-reformist phase has implied a transition from central planning to a socialist-oriented market economy, with the explicit intention of revitalizing the economy. These changes are often referred to as the *doi moi*, or the *new shift* (McElwee 2016). The *doi moi* has implied numerous changes for rural areas and the agricultural sector, including the de-collectivization of farming, liberalization of trade, and reclassification and titling of agricultural and forest lands, all of which have created new patterns of investment and consumption (Sowerwine 2004). The 1993 Land Act introduced land titles and created opportunities for transacting forest land for the first time. The reforms were, however, not implemented uniformly across the country. There were, for instance, differences between the north and the ‘occupied’ south in terms of the pace and degree of de-collectivization (Ravallion and Walle 2003). In addition, hybrid and quasi forms of land titling and transaction emerged in many places.

The *doi moi* coincided with an abrupt ban on logging, and efforts to reforest the ‘barren lands’ of the country. The proactive role taken by reformist socialist states in relation to forest and environmental sector management is claimed (by many) to be a potential way forward for other Asian countries as well:

“The lessons from their [China and Vietnam] proactive policies and strategies for investment in natural capital need to be learnt by other countries in the region. The institutional reforms for enabling conditions and the policy environment [...] should be further investigated” (Janekarnkij and Polpanich 2014: 48).

This backdrop is a key reason as to why Vietnam is considered an interesting country and forms an important empirical case for REDD+ implementation. Forest-sector policy implementation and impacts have evolved differently in different provinces, districts and communes. Understanding the history of forest governance in Vietnam is therefore useful in understanding how forest reforms impact situations differently under varying contexts and settings. Forest-sector reforms should be viewed and understood not purely from forestry and environment perspectives, but also in the light of general trends of the politics of power, command and control, assimilation of ethnic groups,

forced migrations and displacements, and more general political and economic development trends in the country.

4.2 Forest governance in Vietnam (from 1954)

Forests have been a key resource in the history of Vietnam, but their physical characteristics and how they have been valued and perceived by different regimes and groups has changed, both in space and over time (McElwee 2016). During the Vietnam War², the North Vietnam communist regime considered forests as a key resource for financing the war and as safe hideouts and transport routes. By contrast, the Americans and the South viewed the forests as barriers that needed to be removed, resulting in the spraying of forests with a powerful mixture of chemicals, famously known as ‘Agent Orange’. This removed the tree leaf cover, thereby increasing visibility and destroying forest areas as safe havens for the enemy (De Koninck 1999, Dang, Turnhout, and Arts 2012, McElwee 2016). The repetitive spraying and napalm bombing caused immense detrimental effects to the forests of Vietnam (Westing 1975); for example, an estimated 300,000 ha of forests were destroyed due to napalm bombing (McElwee 2016).

In the post-war communist era, a large number of state forest enterprises (SFE) were established, with the objective of providing the state with income and timber from ‘wherever it could be usefully cut’ (McElwee 2016: 10). These enterprises played a key role in the management of forests during the period from the early 1970s until the emergence of the *doi moi*. At the peak, there were about 400 enterprises in the country. The SFEs were, however, unevenly distributed across the country, most densely so in forest-rich regions such as the Central Highlands. Simultaneously, old practices and traditional knowledge about forests were eliminated and replaced with modern, industrial management practices to encourage large-scale timber production (McElwee 2016). This period was characterized to a high degree by large-scale state-led deforestation, uncontrolled logging and a concomitant expansion of agriculture (De Koninck 1999, McElwee 2016).

The early 1990s (the post-colonial period in Vietnam) marked a new shift in forest-sector policies and institutional arrangements, which has – *inter alia* - been attributed to increased awareness of the large-scale loss of forest cover and environmental degradation in the country (McElwee 2004).

² In Vietnam, this is often referred to as the ‘American War’; it is also called the Second Indochina War (Saleminck 2003).

By 1990, forest cover had dropped from 43% to about 20% (De Koninck 1999), and the government saw an urgent need to deal with challenges related to environmental degradation, and trees as key natural resources for sustainable watershed management. The reforms, however, coincided with – and can be linked to – the *doi moi* (*new shift*) and the emergence of ‘market-led socialism’.

In concrete terms, the policy reforms resulted in two large-scale programs to conserve remaining forest areas, and to reforest the ‘barren lands’ of the country. These are known as the 327 and the more recent 661 programs (or the 5 million hectares reforestation program (5MHRP)). While the former encouraged farmers to get involved in planting trees, the latter included the distribution of forest land certificates to individual households (McElwee 2016).

According to official figures, forest cover in Vietnam increased from about 27% in 1990 to more than 40% in 2010 (FAO 2011). While policies are often framed as being the main reason behind marked changes in reported forest cover in the country (see e.g. Mather 2007), the actual effects of policy changes in terms of the environmental and social benefits for rural populations have been heavily debated (e.g. McNamara et al. 2006, Sikor and Nguyen 2007, Nikolic et al. 2008, Clement and Amezaga 2009). Although policies have been shown to yield limited household incomes in the impact zones (Sikor 2011), the negative effects have been considerable, for example, limiting women’s access to traditional sources of non-timber forest products (NTFP) (McElwee 2016). The more subtle goals of the policies must also be taken into consideration when trying to understand the drivers behind the shift. While the official policy goal of the reforestation activities was to ‘regreen’ the ‘barren lands’, the less-expressed goal of providing an emerging pulp, paper and wood chip industry with stable and reasonably priced raw materials was likely a major contributing factor for the emerging forest plantation policies (McElwee 2016).

A prominent feature of the 1993 Land Law in particular, was the emergence of devolving forest land rights and decision-making to individual households (Nguyen 2008, Bayrak, Tu, and Burgers 2013). In policy documents the devolution of forest management is often referred to as the ‘socialization of forestry’ (see for example the 2006-2020 Vietnam Forestry Development Strategy (SRV 2007)). The distribution of forest land rights certificates (*red books*) and planting of trees became a way of claiming rights to land for farmers and households (McElwee 2016). According to McElwee (2016), the reforms in a sense marked a paradigm shift in bringing people back into

the forest, thus erasing previous and predominant divisions between ‘nature’ and ‘society’. Nevertheless, this study investigates how the ‘agriculture-forest divide’ and land categories still have implications for, and impose restrictions on what types of activities may be carried out on various categories of land.

The 1993 Land Law included a reform of the official forest land classification system, designating areas as *special use*, *protection* and *production forest*. Under the new management regime, people and households would play a more active role in forest management, and citizens would be requested to self-regulate the use and protection of forests. For much of the *production* forest land, *red books* were issued and distributed to individual households. On these lands, people were allowed to collect certain amounts of timber and other forest products, and plant trees. *Protection* forests were mostly forest areas viewed as being of higher value, often in relation to watersheds that were considered as key ecosystems for the provision of water and energy. For these lands, so-called *protection contracts* were issued to individual households, to enable them to patrol and manage forests sustainably. Forest Management Boards (FMBs) managed the *special use* forests, encompassing mostly national parks and forest reserves. The FMBs were often SFEs that had been transformed into management units such as parks or nature reserves (McElwee 2016). The restrictions on logging that came with the reforms caused economic difficulties and deficits within many of the SFEs. Due to the difficult economic conditions and shift in management responsibilities, the number of SFEs was substantially reduced from about 400 to 143 that continue to exist today.

The various forest policies were not implemented uniformly and demonstrated different speeds and momentums in different contexts. Furthermore, policy discussions encompassed several directions and discourse subgroups, with concomitant tensions between ‘conservationist’ and ‘socialization’ perspectives (Dang, Turnhout, and Arts 2012). Policy implementation required balancing the interests of different actors and levels of interest, including federal governments, donors, and provincial and communal administrations. The provincial authorities played a key role as intermediaries between different interests and in designing projects based on federal guidelines. At the same time they considered and balanced local strategies for socio-economic development and developing land-use plans (Ohlsson et al. 2005).

4.3 PES and REDD+ in Vietnam

Over the past decade, Vietnam has seen the emergence of what some would refer to as ‘neoliberal’ forest-sector policies (cf. Castree 2008), such as pilot schemes for PES (e.g. Wunder, The, and Ibarra 2005, Tan 2011, To et al. 2012, McElwee 2012) and more recently, REDD+ (UN-REDD 2012). Since 2005, the Lam Dong and Son La provinces have been pilot areas for PES, and since 2010 according to Decree 99, PES has been implemented as a nation-wide program (SRV 2010). PES in Vietnam has frequently been referred to as a success story (To and Santiago 2010, VNS 2014). Critiques of PES have also emerged, including the risks of elite capture (McElwee 2012), lack of clear linkages between payments and performance (To et al. 2012), and, as is the focus of this study, the determinant role of existing institutional structures in forming and often reproducing new policies into replications or hybrid forms of management regimes.

Vietnam was one of the initial UN REDD Programme member countries, and has also received support through the FCPF readiness fund (SRV 2011b). In the first phase of REDD+ in Vietnam, the focus was on developing a national program, which was formally endorsed by the government in 2011 (SRV 2011a). In the early stages, much focus was on readiness, and building institutional capacities within the Ministry of Agriculture and the Forest Inventory and Planning Institute (FIPI), including approaches and guidelines for FPIC, establishing a benefit distribution mechanism for REDD+ funds, and establishing a robust and credible MRV system (UN-REDD 2010). Participatory approaches to MRV were influential (ref. arguably influenced by a *civic environmentalist* perspective/discourse), but powerful actors, such as the FAO, pushed for increased focus and more top-down and mainstream satellite monitoring approaches. Hence the participatory component of MRV was eventually toned down. Many of the early activities were carried out and tested in the Lam Dong province in the Central Highlands of Vietnam, where commercial coffee production had been identified as a main driver of deforestation.

In 2013, Vietnam signed an agreement with the UN REDD Programme for a second phase of funding, scaling up readiness support to include five other provinces in addition to Lam Dong. These included the Ca Mau, Binh Thuan, Ha Tinh, Bac Kan and Lao Cai provinces. These pilot provinces were selected based on certain criteria, including the potential for reducing GHG emissions, enhancing provincial commitments and capacities, and establishing regional collaboration. The aim of Phase II of the UN REDD Programme in Vietnam was to cover a

representative variety of ecological and socio-economic contexts, thus generating a diversity of learning outcomes (UN-REDD 2012). The total budget was about 30 million USD over the period 2013 to 2016. The planned outcomes of the program were to scale up, develop and implement provincial REDD+ action plans.

Vietnam is one of the countries that have submitted an Emission Reduction Project Idea Note (R-PIN) to the FCPF-Carbon Fund (CF) board, and has been endorsed and included as a country in the pipeline of the FCPF-CF. Critics of REDD+ in Vietnam have pointed to the risk of recentralization of forest management in the country. This is due mainly to the revitalization of the government forest ranger system because of the increased need for technical inputs in terms of measuring forest values and carbon contents (McElwee 2016).

5 Methodology

This section presents the methodological approaches adopted in the study. The study was conducted within a program and tradition of interdisciplinary environment and development studies. A main characteristic of contemporary development studies is their multidisciplinary nature. In order to understand the multidimensional challenges of development, such studies frequently apply approaches and techniques that connect the disciplines of economics, geography, political science, sociology and ecology (Sumner 2006). Understanding environmental problems in context demands insights from both the natural and the social sciences (Vedeld 2004).

The coupling of development issues and environmental problems within research can be traced back to the 1980s and the *Our Common Future* report (1987). The concept of ‘sustainable development’ was introduced in this report, which stressed that contemporary development efforts should not compromise the ‘ability of future generations to meet their own needs’ (WCD 1987, para. 27). This implied an increased focus on environmental problems in developing countries, including issues around losses of tropical forests, desertification (environmental degradation in the drylands), air pollution, etc. Nevertheless, the same report has been criticized for introducing the idea of economic growth as a solution to both environmental and social problems (Gómez-Baggethun and Naredo 2015).

The focus of this study is on the management of forests in a tropical country (Vietnam), and to what degree forest policies of the past decades represent sustainable approaches to targeting environmental and social challenges in the rural areas. In order to do so, the study applied an interdisciplinary, mixed-methods case study approach.

5.1 Case studies design

The strength of case studies is that they imply an ‘intensive study of a single unit for the purpose of understanding a larger class of (similar units)’ (Gerring 2004: 342) Case studies are often associated with qualitative research, but combining qualitative data with statistically- analyzed quantitative data can strengthen the analytical approach of case studies (Yin 2009); it all depends on the purpose and objectives of our research (Crotty 1998). A livelihood survey approach was chosen to map the activities of smallholders and patterns of land use. But without combining the

quantitative analyses with more qualitative data on contextual, structural and socio-political factors, the value of such quantitative analyses is limited (Scoones 1998).

An inherent challenge with case studies is drawing general conclusions from very few observations (Ragin and Becker 1992, Yin 2009). This is also the case with disaggregate local land-use change case studies (Hersperger et al. 2010, Angelsen and Kaimowitz 1999). While the strength of local case studies lies in their ability to provide detailed information about the dynamics of drivers of land-use change and environmental degradation, it is a challenge to extrapolate findings and results across geographies. Thus this study does not necessarily capture all (relevant) variations.

The two cases selected for this study will still be of value in understanding discrepancies between policy discourses and assumptions about the causal effects of environmental and forest policies, practical implementation, and land use. The focus was on both how policies and their rationales come about, and to what degree they actually reflect realities on the ground. In this sense, the study explores policy assumptions about environmental change and land use, alluding to Forsyth's (2003) notion about 'environmental orthodoxies'. Such orthodoxies are frequently found within environmental policies and management, often rooted in power structures and control over resources among particular groups or classes within a society.

5.2 Selection of field study sites

Vietnam represents a communist country where top-down one-size-fits-all policy approaches have tended to dominate. However, the effects and attributes of policies on the ground have been different under varying contexts (Clement and Amezcaga 2009). The local-level case studies focus particularly on the attributes of policy transformations, and what implications these may have for concrete policy-making, planning and implementation.

Vietnam serves as an example of a tropical forest country that has been exposed to various agents, policies and processes of forest-cover change. At sub-national level, two provinces were selected representing cases of different forest management regimes and forest-cover dynamics. More concretely, the case study units (provinces) were selected first and foremost on the background of their assumed stages in FT. While the Bac Kan province represents a *forest mosaic*, where a net forest-cover increase has taken place over the past 20 to 30 years (Do 2014), Lam Dong is representative of a *frontier* zone where forest cover reportedly has been on retreat in recent decades (Meyfroidt, Vu, and Hoang 2013).

The selection of field study sites was subject to a number of other considerations. The selected provinces were intended to be representative of variations in historic, physical, cultural, political and governance characteristics of the country. Both provinces were also part of the national REDD+ piloting program, and have a relatively high forest-cover density (Fig. 6).

Lam Dong represented a deforestation context where protection measures have been predominant. In contrast, in Bac Kan forest cover has reportedly been increasing and planting of trees has been a key policy intervention amongst rural households. Since 2005, the Lam Dong province has been a pilot province for the national PES program. Bac Kan has been subject to national policy schemes to increase forest cover and reforest the 'barren lands', including both the 327 and the 661 programs. In this sense, the study sites represent interesting contexts for studying forest transitions and the effects of policies on forest dynamics and livelihoods. While some studies have explored the 'famous' FT of Vietnam in a national or regional context (see e.g. Meyfroidt and Lambin 2008, 2009), few studies have compared the dynamics of forest transitions and interaction between forest-cover dynamics and policy effects sub-nationally. The following two subsections present the main characteristics of the respective provinces.

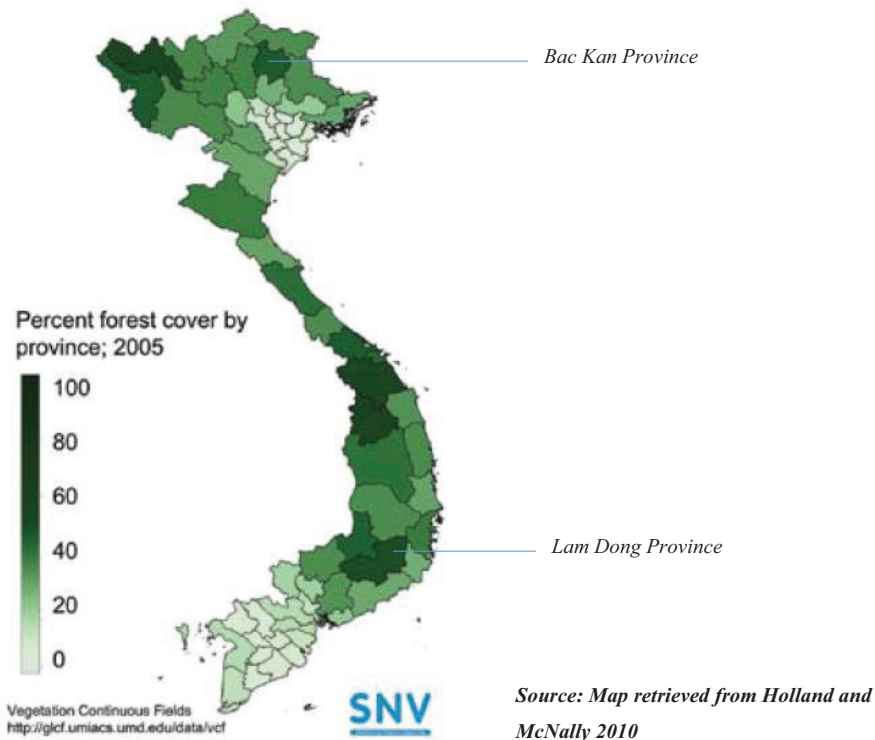


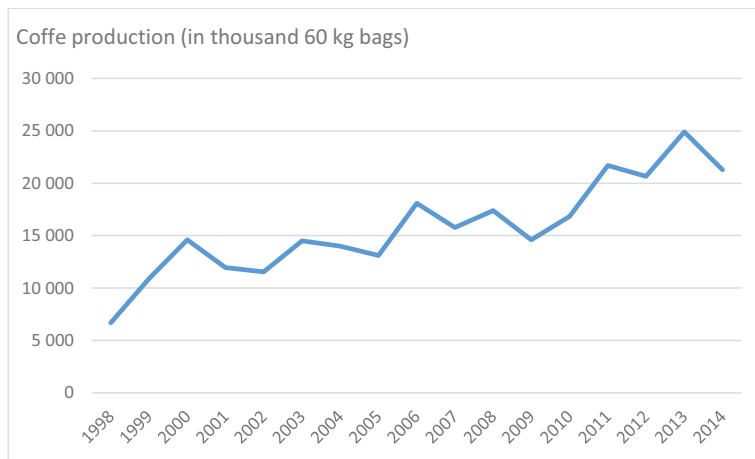
Figure 6. Map of Vietnam, with forest-cover density (in 2005) and location of the case study provinces Bac Kan and Lam Dong.

5.2.1 Lam Dong province

The current boundaries of the Lam Dong province were formed in 1976 (De Koninck 1999). The province lies in the Central Highlands, and the provincial capital is Dalat. The total area of the province is 9,773.5 km², with a population of 1,259,300 (GSO 2014). The population density was 129 per km² in 2014. The climate is of a highland type, with an average temperature ranging between 14 and 23 °C. The rainy season is from May to October, and the dry season from November to April. The average annual rainfall is about 2,000 mm, but with considerable local variations in rainfall patterns. Lam Dong is landlocked and borders six other provinces: Khanh Hoa, Ninh Thuan, Dong Nai, Binh Thuan, Dak Lak and Dak Nong.

According to the Lam Dong provincial administration, there are more than 40 ethnic groups residing in the province (LDPPC 2016). Amongst the largest ones are the *K'ho*, the *Ma*, *Hoa* and the *Chu Ru*. However, in one way the ethnic boundaries are somewhat 'constructed', as the French colonialists tended to categorize people based on language groups. Historically, ethnic boundaries have in reality been fluent and flexible (Salemink 2003). Nevertheless, people do see themselves as, and identify with the various 'constructed' ethnic categories.

The Lam Dong economy is mainly agricultural-based, with a focus on commercial perennial crops such as coffee, tea and rubber. The production of coffee, in particular, has increased, following a general trend across the country and in the Central Highlands as the core area for coffee production in the country. Over the past two to three decades, Vietnam has grown to become one of the largest producers of *robusta* coffee globally, and since 1998, despite highly volatile production levels, overall coffee production has more than tripled (Fig. 7. Agriculture is predominantly commercially oriented in Lam Dong, but some farmers, especially the poorest segments, continue to rely on some subsistence crops for their livelihoods.



Source: International Coffee Organization (ICO) (2014)

Figure 7. Overview of coffee production in Vietnam, 1998 – 2014.

The Government of Vietnam has, over the past four decades, planned to develop and populate the Central Highlands, including Lam Dong. After the Vietnam War and during the 1980s, Lam Dong was defined as one of the new economic zones (NEZs), and people, especially from the north of Vietnam, were encouraged to migrate, populate and develop the province. The migrants were mainly ethnic Vietnamese (*Kinh*) people, but a substantial number of *Tay* also moved from the north and settled in the Central Highlands. In the period between 1979 and 1989, the population of Lam Dong increased dramatically from 388,244 to 639,224 (De Koninck 1999). The *Kinh* is today the dominant ethnic group, constituting about 80% of the total population. Even though the official government communications has tended to focus on poverty and the activities of ‘ethnic’ peoples, the past deforestation and degradation of forests can to a large extent be linked to the large *Kinh* migrations and their agricultural expansions (De Koninck 1999).

Lam Dong is considered a ‘forest province’, with forests covering about 70% of the total land area (Fig. 6). The Central Highlands have historically been considered as inaccessible by the state apparatus, due to the large areas of forests and the wilderness features. However, since the unification between the North and the South, the government has had a firmer grip on forest management in the province. This also reflects the fact that the forest resources found in the province are of high economic value. Forest cover has gradually decreased in the province up to the present time, reportedly due to agricultural expansion and uncontrolled logging by both state actors and illegal loggers. According to official data from the Vietnam Forest Inventory and Planning Institute, the area of natural forest decreased by almost 17% between 2002 and 2013 (FIPI 2013).

Since 1975, the SFEs have played a key role in forest governance in the province, controlling most forest land and resources, and extracting timber and generating income for the Vietnamese state. The SFEs today continue to play an important role since they manage about 28% of the forest land in the province. More than 48% of the land is controlled by the Forest Management Boards (FMBs) (UN-REDD 2012). Considering that the FMBs frequently have been formed on the structures of transformed SFEs (McElwee 2016), the share of forest areas controlled by the SFEs could in reality be considered higher than 28%. Only a little more than 1% of the forest land rests with individual households.

There is a predominant perception commonly expressed amongst officials and other actors within the forestry sector, that the distribution of forest land rights to individual households is difficult, since ‘most forest land in Lam Dong is either of *protection* or *special use* types’³. The official figures show, however, that this is only partially true. The relative share of production forest is lower than for other provinces, but it is still substantial (28.2% compared to the share of individually managed forest land of 1%) (Table 1).

In Lam Dong, the forest reforms that were carried out in the 1990s focused mainly on protecting the remaining forest areas, and less attention was paid to establishing tree plantations. There are two national parks in the province, that fall under the category of *special use forest*. The area referred to as the Cat Tien National Park today was already established in 1978, but its current form and size dates back to 1998. The Bi Doup Nui Baa National Park was established in 2004. The surroundings of the Bi Doup Nui Baa Park also contributed to the context for selecting the case study communities in Lam Dong.

Table 1. Types of forests, area and percentage of total area in Lam Dong province, Vietnam, 2015.

Forest categories	Area (ha)	%
Production forest	143 242	28.2
Protection forest	281 782	55.6
Special use forest	82 251	16.2
Total	507 275	100

Source: Ministry of Agriculture and Rural Development (MARD 2015).

Due to its key importance in terms of biodiversity and rare species, such as the Vietnamese Rhino found in the Cat Tien Park, the province has been subject to numerous interventions and support from international donors and environmental NGOs. These include, *inter alia*, the Netherlands Development Organization (SNV), the International Union for the Conservation of Nature (IUCN), Birdlife International, and the World Wildlife Fund (WWF). More recently, some of these have also been involved in the planning, implementation and testing of innovative market-based

³ Interview with Vietnamese researcher.

approaches for environmental management and protection, such as PES and REDD+. Numerous studies and reports on impacts of innovative approaches have been published in recent years (Chiramba, Mogoi, and Martinez 2011, Wunder, The, and Ibarra 2005, Ogonowski and Enright 2013, Vu Tien Dien and Grais 2013, Tan 2011). Even though the prospects for PES were believed to be meagre at the outset (Wunder 2005), Vietnam (and Lam Dong in particular) is frequently referred to as a success story in terms of large-scale PES implementation (VNS 2014, Tinh, Tuan, and Tran 2014, Tacconi 2015).

5.2.2 Bac Kan province

Bac Kan lies in the northeast region of Vietnam with the regional centre at Bac Kan City. The province covers an area of 4,859.4 km². With a population of 307,300, the population density is 63 per km² (GSO 2014). Bac Kan is landlocked, and bordered by four other provinces, including Cao Bang, Lang Son, Thai Nguyen and Tuyen Quang. The landscape is mountainous and rugged, with lowland valleys suitable for paddy rice production.

In Bac Kan, some 86.7% of the population is defined as ‘ethnic minorities’. The largest ethnic minority group is the *Tay*, followed by the *Nung* and the *Dao*. A poverty rate of 37.0% (compared to the national average of 13.4), makes Bac Kan one of the poorest provinces in the country (Hoang et al. 2013). As in Lam Dong, the various ethnic groups in Bac Kan have been exposed to efforts by the Vietnamese state to assimilate and control their activities and resources. During the sedentarization and collectivization processes from the 1960s up until the 1980s, many of the ethnic groups were forced to reside in the lowlands and to start cultivating lowland rice (Castella and Dang 2002). In addition, substantial lowland rice areas were confiscated from the *Tay* households who traditionally had resided in the lowlands, and redistributed evenly across households for communal production (Fatoux et al. 2002).

The *doi moi* and the land and forest reforms of the 1990s imposed a general ban on the traditional shifting agriculture activities in Vietnam (Clement and Amezaga 2008). They also led to many *Tay* households reclaiming the ancestral lands that they had lost during the collective period, and many other ethnic minority households were left with forest land to sustain their livelihoods. This has meant that many households still continue their traditional – but modified – mode of cultivation within forest land areas (Do 2014).

Agriculture is the main economic sector in the province, and subsistence rice production predominates. Livestock is also important for rural households, including buffaloes, pigs, poultry and fishponds. In terms of agriculture, there are some differences between ethnic groups and adaptations: the *Tay* traditionally cultivated lowland paddy rice, and the various other ethnic groups practicing shifting agriculture of upland rice, maize and cassava. The upland ethnic minorities in the northern areas of Vietnam are characterized by a high degree of communal and collective values (Kerkvliet 2005).

Bac Kan is one of the provinces where the forest-sector policy focus has been to increase forest cover. Large areas of forest cover were lost and degraded in the post-colonial and collective era. During recent decades, government efforts to promote forestry and plantation activities have been a prominent trait of regional forestry policies. The replanting efforts in the province have been under the auspices of the 327 and the 5MHRP (see earlier). This relates mainly to small-scale forest plantations for providing the pulp and paper and wood chip industries with raw material (Lang 2002). Data is scattered and somewhat unreliable for the whole 1990-2014 period, but official figures indicate that due to large-scale replanting efforts, forest cover has increased from about 49.1% in 2002 to 58.7% in 2011, indicating an increase of almost 10% over a ten-year period. Nevertheless, even though the trend has been positive in recent decades, forest degradation and illegal logging of certain rare tree species are persistent issues in the province (UN-REDD 2012).

The focus of reforestation activities has been on households and small-scale producers. Official figures indicate that forestry has become an increasingly important economic activity in the region, since wood products have increased from about 20,000 m³ in 1995 to about 85,000 m³ in 2013 (GSO 2013). Nevertheless, studies on the economic benefits of forest plantations indicate that the poorest households gain few benefits, and that the policies have in many cases contributed to increasing inequalities instead of decreasing them (e.g Sikor 2011, Sikor and Nguyen 2007, McElwee 2009). The 5MHRP has combined planting activities with large-scale distribution of forest land to households. Due to the forest tenure reforms, about 60% of forest land in the province is now allocated to households (Do 2014). This counts then, for the majority of production forest land, but also some protection forests. The number of SFEs have been reduced in Bac Kan, and

they and the FMBs play a minor role in forest management in the province (compared to that in Lam Dong).

In terms of forest conservation, 7.7% of the forest areas are defined as the *special use* category (Table 3). There is only one national park in the province, the Ba Be National Park, which was established in 1992, and covers an area of about 100.48 km². Awareness of the roles of forests in climate change, and the importance of binding CO₂ by increasing both forest densities and areas, have made Bac Kan an interesting case in terms of REDD+ efforts in Vietnam. Bac Kan has therefore been selected as one of six REDD+ pilot provinces in Phase II of the UN REDD Programme (UN-REDD 2012).

Table 2. Types of forests, area and share of total in Bac Kan province, Vietnam, 2015.

Forest categories	Area (ha)	%
Production forest	230 864	68.7
Protection forest	79 342	23.6
Special use forest	25 837	7.7
Total forest area	336 043	100

Source: MARD (2015)

5.3 Primary data collection methods

Data sources and collection approaches were selected on the basis of the four research objectives. Primary data was collected through semi-structured and key informant interviews and a household livelihood survey. These were combined with observations and measures of land use in the field, and reviews of policy documents, maps and satellite images that are publicly available. The database of Vietnam's General Statistics Office (GSO) also provided the study with important socio-economic data and province-specific contextual information.

Data collection was conducted over three fieldwork periods: the first focusing mostly on policy data at national and provincial levels; and the second and third on collecting livelihood and land-use data amongst households in the two provinces. It was necessary to obtain formal permission to carry out fieldwork in the communes. Research permits were obtained through the UN REDD Programme office in Hanoi. This also had to be approved at the provincial level, before we were allowed to enter the communes. Once in the communes, we had to obtain approval from the

directors of the Commune Peoples' Committees. These permissions had to be shown to the village heads before we could start the fieldwork in the villages.

Ahead of interviewing people, we gave assurances of confidentiality and obtained informed consent for carrying out the interview. We informed people about the objectives of the study and the purpose of interviewing them. The same procedures were carried out for both the in-depth and the survey interviews. For the in-depth interviews, a tape recorder was used if the interviewees were comfortable with this. In-depth interviews were carried out either in English (most often with international NGOs and government officials in Hanoi), or via an interpreter when the interviewee spoke only Vietnamese.

The survey was carried out with the support of an interpreter and a team of research assistants. In the case of Lam Dong, these were obtained through the University of Dalat, while in Bac Kan, support was provided by the World Agroforestry Center (ICRAF) office in Vietnam. The teams of field assistants and interpreters were instructed and trained before conducting the survey.

Normally, village heads would provide us with support and sometimes a 'guide' who could help us identify the households we intended to interview. Interviews were carried out with the household head and/or their spouse. Sometimes other family members were also present during the interview. The interview typically lasted between 1 and 1.5 hours.

The quantitative survey data was analyzed using the JMP (SAS) software, and the qualitative data was transcribed and analyzed using NVivo.

5.3.1 Semi-structured and key informant interviews

Interviews with key agencies, implementers and other relevant stakeholders revealed how – and to what degree – challenges related to environmental degradation and deforestation are framed differently between different actors and within policy discourses. This data is a key component in Paper 1, on the transformation of PES policies in planning and implementation. It also provided crucial contextual information for the other papers. Without this information, the quantitative livelihood data would not have gained its full meaning (Angelsen 2011). The two livelihood papers, to a high degree, combine the quantitative livelihood data with the qualitative data in the analyses, thus reflecting the interdisciplinary nature of the study.

In total, we conducted 36 in-depth semi-structured interviews with policy makers and implementers at different geographical levels (national, provincial and commune), NGOs, donors and national researchers (Annex 2). My previous experience working with different policy actors in Vietnam through the Norwegian Agency of Development Cooperation (Norad), provided me with a good point of departure in the sampling of interviewees and in conducting the in-depth interviews. Through the initial interviews, new interviewees were identified, much in alignment with the principle of *snowball sampling* (cf. Goodman 1961). Some interviewees were consulted on numerous occasions, and a handful of key informants have been close discussion partners during the whole timespan of the project.

5.3.2 Survey

In total, 200 households were interviewed in the livelihood survey, 100 in each province. Four villages were randomly selected in two communes in Lam Dong, while a more stratified approach was applied in Bac Kan. The reason for selecting such an approach in Bac Kan was to cover highland-lowland distinctions in terms of agricultural production and socio-cultural characteristics. Such differences were negligible in the Lam Dong case. At village level, households were selected randomly from the communes' official lists of households in the respective villages. In order to obtain statistically viable data at village level, we aimed to select about 25 households from each village, regardless of village sizes. In one village in Bac Kan, this involved interviewing all (22) households.

The survey questions focused on household livelihoods, including their assets, activities and outcomes, with particular emphasis on the interaction between livelihoods and land use (see Annex 1 for details). In the livelihood model, we viewed livelihood incomes as a function of various socio-economic factors and capitals, such as financial assets, human (level of education), livestock, land, gender and social capitals (measured through number of days of collective work). Both livelihood papers (3 and 4) also categorized households into three equal-sized wealth groups based on yearly livelihood incomes (subsistence and non-subsistence). Households were selected according to official commune lists of households in the respective villages. This was found to be an appropriate way of defining and identifying households. Only in one case in Lam Dong, a selected household was found to have a shared economy with another household. In this particular case, the two households were merged and treated as one.

5.3.3 Land-use change data

It was important to access information about the sizes of land holdings and type of use on the respective land plots. Two approaches were used to obtain this information. First, land certificates provided information reflecting cadastral measurements carried out by the government. Secondly, where households had land plots without land certificates (either because the land was not certified, or if the certificate was unavailable for various reasons), we carried out in-field measurements of these areas. This was particularly the case in Lam Dong, where most of the coffee production takes place on land categorized as forests. In Bac Kan, most households tend to have land certificates available for both agricultural and forest lands. Here however, areas cleared for agriculture within forest land in most cases did not coincide with certified forest lands at the disposal of households. We decided to focus on measuring the size of agricultural fields inside the certified forest lands of a household. In total, we carried out 274 field measurements of cultivated land holdings – 181 in Lam Dong and 93 in Bac Kan. Often the land would be far away from the villages and beyond the reach of walking or travel by car. In such cases, we hired local people to take us there on motorbikes.

The field measurements involved extra time and costs, but provided the study with more accurate data on land sizes and land-use practices, compared to collecting such information only through the survey interviews. They also enabled us to upload GPS coordinates and observe how the land use had changed over time on the respective fields. We used simple Google Earth tools to provide images from 2005 and 2008 to trace whether land had been cleared or fallowed in the period up to 2014. Combined with other available online mapping tools of land-use change, such as MODIS VCF/Landsat data provided by Hansen et al. (2013), this gave us a good picture of the history of the respective land plots.

Official statistics from the Vietnam Forest Inventory and Planning Institute (FIPI) provided information on forest-cover trends at provincial levels. This data formed the main basis for Paper 2, which provides insights into forest transition trends in the respective case study provinces. The FIPI data is based on trends reported by local forest rangers in their respective areas in terms of areas planted, burned and cleared each year. This provincial aggregate forest-related data is available online at www.kemitran.vn (FIPI 2013). The main challenge with this data is the risk of inconsistent data collection approaches, and interventions from authorities in the reporting, which might compromise the neutrality of the data (Nguyen 2013).

5.3.4 Policy review

A key component of the study was to review contemporary and policy documents of the past. This provided knowledge about forest policy development and discourses in the country. A particular focus here was on the 1990-2014 period, which is by many seen as a paradigm shift in Vietnam forest sector policies in relation to the *doi moi* forest sector reforms (e.g. McElwee 2016). We also consulted other studies and documents on previous management regimes and events. This provided information about the history of environmental and forest management, agriculture and ethnography of the country in general, and the specific case study contexts.

5.4 Research challenges: Reliability, validity and representativity of the data

The fieldwork involved several challenges that had to be dealt with, and that could potentially affect both the reliability and validity of the data. While reliability refers to the stability and quality of the data, validity is concerned with the logical consistency of the argument, i.e. to what degree the data supports the conclusions of the study. Applying multiple methods may in general contribute to an increase in both the reliability and the validity of the data. Triangulation, which refers to the use of several kinds of methods to secure an in-depth understanding of the phenomenon in question, ‘is not a tool or a strategy of validation, but an alternative to validation’ (Denzin and Lincoln 1994: 2). The triangulation of approaches in this study was an important strategy to mitigate many of the challenges in the data.

The quality of the data collection was affected by a number of factors. First, many of the livelihood activities carried out by households are, formally speaking, illegal. This relates in particular to cultivation of land classified as forests, and the extraction of certain forest and timber products. In the study area of Lam Dong, this applies to much of the land under coffee production. Some of the farmers we interviewed told us stories about ongoing conflicts with forest rangers, who occasionally would rip up newly-planted coffee seedlings in some of their coffee plantations. In order to avoid under-reporting of such activities, we purposely avoided any reference to ‘illegal’ during the interviews. By simply asking farmers about their activities and the number of cultivated fields, and by making field visits, observing land-use activities and reviewing satellite images of the area, we believed that we could obtain better representativity of the data.

Second, research fatigue amongst some of the respondents and lack of motivation to participate in the survey was considered a risk. This was particularly the case in some of the villages in Lam

Dong. Here communities have been subjected to a number of previous studies and evaluations, focussing in particular on the impacts of the PES pilot that has been ongoing in the area over the past six to eight years. In a few instances, we met people who were not motivated, and demanded high ‘salaries’ before participating. In these (few) cases, we discarded these households from the sample and replaced them with other randomly selected households.

Third, there are methodological challenges in combining time-series data with cross-sectional household income data. While the livelihood data represents a ‘snapshot’ of a household’s livelihood situation at a specific time in the household life cycle (which would normally change over time), the time-series analyses of land use represent dynamics over time. Nevertheless, the land-use data was still of value in order to develop an indicative estimate of the average rate of forest-cover dynamics due to small-scale livelihood activities. The land-use data was also important in contextualizing policy discourses around the drivers of deforestation, environmental degradation and reforestation processes. The wealthier *Kinh* households, that were particularly present in the Lam Dong study area, had a tendency to be more ‘protective’ in terms of providing accurate information about incomes and assets. There is therefore a risk that the reported levels of income and assets for these households are lower than in reality. Nevertheless, their registered income and wealth levels were still much higher compared to the poorer and ‘ethnic minority’ households, so in this sense, we believe this under-reporting did not affect the main results and findings significantly.

Fourth, recalling livelihood incomes was sometimes a challenge for respondents. Income estimates were made based on the activities and outcomes of households over the past 12 months. This data therefore depended on the farmers’ ability to accurately recall crop harvest levels, salaries, number of days of paid work, etc. It was particularly challenging for farmers to remember the amount of harvest gathered from different pieces of land. It was easier for them to remember the total, and then estimate the types and approximate share of the harvest for each piece of land.

Fifth, we encountered a particular challenge in Lam Dong, in estimating the coffee incomes households. About 25% of the households had higher expenditures than gross incomes from their coffee plantations. The explanation for this is likely to be the high upfront investment costs of establishing new coffee plantations, which do not yield any crop incomes until three to five years after establishment (Thang, Burton, and Brennan 2009). In the survey, many households seemed

to have established new plantations in 2010/2011, implying no or very low incomes, combined with continued high input costs in terms of fertilizers and pesticides, resulting in negative agricultural incomes in the survey year (2014). The negative or low incomes could, of course, be a reflection of the general reluctance to share information about income and wealth, since official government wealth rankings are used in various social welfare and agricultural support schemes. It could also be that local people saw the survey team as representing the government in some way or another, thus causing a bias in reported incomes.

Nevertheless, similar results were found in other studies carried out in the area (e.g. Tran (2010)). The negative incomes are therefore considered to be related to the nature of cost and income distributions that accrue to households in varying degrees over time. In order to adjust for this ‘misrepresentation’ and present a more realistic long-term income concept, a mean future income ‘index-adjusted’ value of the respective coffee producing areas was calculated. This was based on the mean gross value of coffee production per area across households. These figures were used as an indicator of the net coffee income, multiplied by the land available per individual household (see Paper 3 for more details).

5.5 Secondary data

Several secondary data sources were consulted. Previous research carried out in the study area provided key background information and was an important source of triangulating the findings. Paper 2 is to a large extent based on a literature review of secondary sources on policy processes and land use in the Bac Kan and Lam Dong provinces. Studies of particular importance in relation to the impacts of, and experiences with PES in Lam Dong have been carried out by the Center for International Forestry Research (CIFOR) (e.g. Thu Thuy, Garnett, and Aslin 2011), SNV, and the International Institute for Environment and Development (IIED) in collaboration with the Norwegian University of Life Sciences (NMBU) (e.g. Enright 2012).

In relation to the Bi Doup Nui Ba National Park conservation project, a participatory rural appraisal on livelihoods in the surroundings of the park was carried out by Hoang et al. (2011). This was a very important source of information in the preparation phase of the fieldwork and data analyses in this study. In Bac Kan, ICRAF has carried out several studies and produced publications on forest management and agroforestry, which were also crucial in the preparation and in qualification of our datasets. The same applies to the numerous useful studies and publications that resulted

from the Mountain Agrarian Systems (SAM) Program. This was an interdisciplinary research collaboration carried out in the Bac Kan province from 1998 to 2002 by the Vietnam Agricultural Science Institute (VASI), the Institut de Recherche pour le Développement (IRD), the International Rice Research Institute (IRRI), and the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) (Castella and Dang 2002, Castella, Manh, et al. 2005, Castella, Boissau, et al. 2005, Castella et al. 2006, Castella and Verburg 2007).

In summary, the study applied a comparative and interdisciplinary theoretical approach to investigate forest-sector policy development, and its interactions with livelihoods and land-use processes. Various methods and approaches were used (see Table 3) to respond to the research objectives. The findings of the study are reflected through the four papers produced throughout the project period, which are presented in Part II of the thesis.

Table 3. Summary of analytical and methodological approaches of the study.

Research Objective/ Paper	Theoretical framework(s)	Data collection approaches (analyses)
1	Critical institutional path dependency	In-depth interviews Policy and literature review
2	FT policy framework	Policy and literature review Official statistics on forest-cover trends In-depth interviews
3	Livelihoods framework Political ecology	Livelihood survey (multiple regression; ordinal and nominal logistical fit) In-depth interviews Policy review
4	Livelihoods framework Critical institutionalism	Livelihood survey (multiple regression; ordinal and nominal logistical fit) In-depth interviews Policy review

6 Summary and conclusions

The purpose of the study was to explore forest-sector policy development, and its interactions with livelihoods and land-use processes at multiple scales and contexts in Vietnam. Various dimensions related to the research objectives have been discussed in four interrelated (but independent) papers. This section presents summaries of the four papers. It also contains a discussion of the linkages and overall arguments and findings across the papers.

6.1 Analyzing the transformation of forest PES in Vietnam: Implications for REDD+ (Paper 1)

Paper 1 aimed at *advancing knowledge about the complexities of developing and implementing new environmental policy schemes (regimes), taking the case of forest PES in Vietnam*. Two interrelated research questions were posed:

1. *How has PES as a policy framework been transformed in policy planning and implementation at multiple governance scales?*
2. *What are the implications and prospects for REDD+ in view of this?*

In order to respond to the questions, the study applied a critical institutional framework to analyze the transformation and path dependency of market-resembling environmental policy processes of forest PES in Vietnam. Researchers have pointed to the risks of elite capture of PES benefits, and the reinforcement of inequality structures, such as access to resources and land controlled by government companies and structures (McElwee 2012). The way PES has been designed and implemented in Vietnam also lacks clear linkages between incentives (payments) and performance (Thu Thuy, Garnett, and Aslin 2011).

In many ways, PES builds upon existing institutional structures and forest management and protection approaches that were established in the 1990s. This study has demonstrated how PES did not enter an institutional void, but was rather transformed through a process of interacting with existing institutional structures. This process of institutional ‘bricolage’ partly reflects established norms and values about the ‘best’ ways to organize forest management, and existing structures of power, tenure and group control over forest resources. In this sense, from a path dependency perspective, we found that PES does not represent a ‘critical juncture’ with profound impacts on

the future trajectory of forest management. This and other findings may have important implications for the prospects of implementing similar initiatives, such as REDD+. Future PES and REDD+ schemes should, to a high degree, take into account in their planning and implementation, the effects of institutional reproduction, interplay and path dependency. They should also expect limitations and challenges regarding these issues.

6.2 Sub-national forest transitions and policies in Vietnam (Paper 2)

Paper 2 aimed to explore how - and to what degree the FT policy framework is useful for understanding policy development and forest-cover dynamics at sub-national levels in Vietnam.

This included three research sub-questions:

1. *What are the dynamics/drivers of forest transitions at provincial levels in deforestation and reforestation zones in Vietnam?*
2. *How do different policy levels influence processes of forest-cover change and transitions?*
3. *What are the implications of the findings for the conceptualization of forest transitions and policies for curbing deforestation and forest degradation, and enhancing forest carbon stocks?*

This paper compares forest transitions (FT), policy reforms and forest cover change in the Bac Kan and Lam Dong provinces of Vietnam. In REDD+ programs, there is an increased focus on how an FT policy approach may be applied to design appropriate policies and measures to deal with deforestation and forest degradation at multiple scales (Angelsen and Rudel 2013). Vietnam has seemingly been able to shortcut the perceived FT stages by quickly moving to the reforestation phase, which makes it an interesting case country. The two provinces analyzed in the paper represent different stories of forest-cover dynamics and change. While Bac Kan serves as an example of a province where there has been a net forest-cover increase in *forest-agricultural mosaic* landscapes, Lam Dong is still experiencing a net forest cover loss. The results demonstrate that provincial level forest cover and socio-economic trends are not necessarily comparable and compatible within a FT analytical framework. Bac Kan is one of the poorest provinces, but has experienced forest regrowth and expansion of forest cover during the past couple of decades. In contrast, Lam Dong province has both higher GDP and population levels, but has had higher levels of deforestation, particularly linked to the expansion of perennial crops. This is quite contrary to

what could be expected from a conventional FT hypothesis. The FT turnaround and land use dynamics were found to be linked to the overall and all-encompassing policy shift (*critical junctures*) related to de-colonization, state-control and collectivization, and the *new shift* of “market-led socialism”, decentralization and land tenure reforms. The findings demonstrate that policies can trump typical FT patterns linked to general development trends. This provides a sense of relief in the way that the FT-trajectory is not unavoidable. Policies can make a difference. Yet, these policies have not primarily been guided by forest conservation concerns, but have rather been a side-effect of economic development and political objectives.

6.3 Livelihoods and land uses in environmental policy approaches: The case of PES and REDD+ in the Lam Dong Province of Vietnam (Paper 3)

Paper 3 explored the *assumed processes driving forest-cover change in the context of the Lam Dong province in the Central Highlands of Vietnam*. Four specific interrelated research questions were posed:

- 1) *How do households manage and diversify assets and resources to generate livelihood outcomes?*
- 2) *What are the impacts of PES policies on livelihoods, environmental awareness and deforestation?*
- 3) *How do the overall production structures of the coffee economy affect livelihoods and deforestation processes?*
- 4) *What are the potential implications for emerging REDD+ policies?*

In policy discourses in Vietnam, deforestation tends to be linked to the ‘poor’ and ‘ethnic minority’ households and unsustainable practices such as the expansion of coffee production (and other agricultural activities) into forest areas. This paper applied a livelihoods framework (LF) to discuss the links between livelihoods and land use amongst small-scale farmers in two communities in the Lam Dong province.

The findings of the livelihoods survey do not demonstrate any clear linkages between poverty levels and unsustainable land-use practices. However, the qualitative data pointed towards several underlying factors related to the production structures of the coffee economy, in which a dominant

group of farmers are in control of coffee sales and key production inputs, as well as illegal transactions of productive land. This group of farmers is solely of Vietnamese (*Kinh*) origin, representing the interests of the Vietnamese state in developing the Central Highlands of the country. The study found that the expansion of commercial coffee production is an important strategy in official policies.

The way that current PES and REDD+ approaches have been designed (based on simplistic ‘poor/rich’ and ‘minority/majority’ dichotomies), does not provide adequate solutions in addressing the underlying problems and issues at stake. The paper criticizes one-dimensional perspectives on the drivers behind deforestation and environmental degradation, and recommends comprehensive analyses of the underlying factors, encompassing the entire coffee production system. The paper makes the case that it is critical to address issues of tenure and the lack of productive lands, and creating viable off-farm income alternatives. Sustainable approaches for reducing deforestation and degradation could be possible through engaging with multiple stakeholders, including the wealthier, business-oriented households who control the coffee trade and land transactions.

6.4 Cultivating forests: Exploring the productive values of forest land in a reforestation zone of northern Vietnam (Paper 4)

Paper 4 aimed to *explore the role of forest land in household livelihood adaptive strategies in a reforestation zone in the Bac Kan province of northeastern Vietnam*. Four interrelated research questions were identified:

1. *What is the role of forest land in household livelihood adaptation strategies?*
2. *How have households in the study area adapted differently to policies related to forest land use?*
3. *How do contextual factors influence household adaptation strategies in the use of forest land?*
4. *What are the implications of the findings for innovative market-based policy mechanisms, such as REDD+ and PES schemes?*

The paper challenges the predominant forest-agriculture dichotomy perception in policy making and research projects in Vietnam. Such dichotomies are not specific to Vietnam, but permeate global climate and forest debates. This perception views forests as being of higher value if they are kept standing, and that agricultural practices, forest conservation and sustainable use of forests are mutually exclusive activities.

The study is based on a survey carried out in the Bac Kan province, and applies a livelihoods framework to investigate the multiple values of forest lands in household economies. The case demonstrates the complexity of adaptations to forest-sector policies, and found that households in different institutional and agro-ecological locations use landscapes differently along a forest-agriculture continuum. The findings on the multipurpose uses of forests may have important implications for climate-related forest policies, such as REDD+ and Reduced Emissions from All Land Uses (REALU). Policy makers should engage with local communities, their social institutions and agricultural practices, and consider context-specific approaches for integrating the objectives of conserving trees, increasing carbon stocks and enhancing the total productivity, outcomes and values of landscapes – including agriculture. The study recommends inter-sectoral and multi-stakeholder policy approaches to integrate and mainstream multiple objectives, including forestry, agriculture, energy and environmental services such as food production, carbon capture and storage, water provision, and biodiversity conservation.

6.5 Concluding remarks

The study has applied interdisciplinary theoretical and methodological approaches to explore the multiple dimensions of forest-related policy development and their implications for livelihoods and land use in two comparative contexts of Vietnam. In doing so, the study confirmed the complexities of policy planning and implementation, and the problems related to one-dimensional (reductionist) policy models in dealing with environmental challenges and forest-sector development. Forest governance theory and institutional path dependency have been of critical importance to the study

The study has defined certain points in time as critical in the history of forest sector management in Vietnam. One such critical event was independence from French colonial rule, which resulted in the nationalization of forest and agricultural lands, and the collectivization of rural production systems. For various reasons (such as the North-South divide, the Vietnam War, etc.), the events

evolved at different speeds and with different approaches in various contexts of the country. A second critical change was the shift towards market liberalization and decentralization that took place in the mid-1980s and onwards, often referred to as the *doi moi*. These events have had important implications for land use, agricultural development and forest management.

The study used the case of introducing PES to discuss to what degree this represents a *critical juncture* and shift in management regimes in the Vietnam forest sector. In view of other and more fundamental policy reform processes that have taken place in the country, we found that PES does not represent such a critical change. Rather, due to the complex interests, norms and values of various actors involved in planning and implementation, PES was reproduced and modified along the lines of existing institutional systems and structures, thus reinforcing and modifying approaches developed through previous forest sector and land reforms.

In a sense, PES should rather be viewed as a prolongation and incremental development, starting with the fundamental changes (*critical junctures*) that were spurred by the *doi moi* and the development of a market-economy with a ‘socialist face’ in the second half of the 1980s, which reached the forest sector in the early 1990s. Innovative, market-based policy approaches such as PES and REDD+ face the risk of institutional reproduction, representing prolongations of existing resource regimes. In analyzing the effects of PES and the prospects for REDD+ programs, the concept of institutional path dependency was found to be particularly relevant. Here, PES is not considered to represent a new critical juncture in the history of forest management in Vietnam, but rather a medium through which existing institutional structures and actors’ interests could be modified, and to a large extent, actually reproduced. In a sense, PES, and other policy reforms of the past decades since the *doi moi*, all fit into - and contributes – to the evolvement of a market-led and devolved forestry regime (Fig. 8).

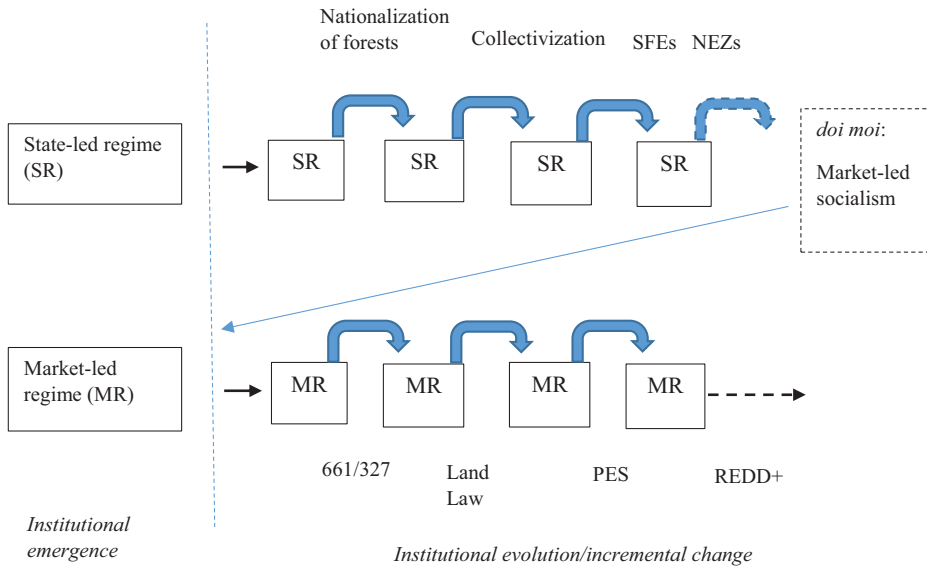


Figure 8. Historical processes of institutional change and reproduction in Vietnam.

FT is a predominant analytical lens through which forest-cover development has been understood and analyzed in Vietnam (e.g. Meyfroidt and Lambin 2009, McNally et al. 2016). FT assumes that forest-cover dynamics are somehow predictable, driven by general socio-economic development, and by the differential evolutions of land and forest rents in particular. FT has further spurred notions about policy reforms that can be constructed according to the various stages of FT that developing countries and regions are in, for example, a *forest transition policy approach* (cf. Angelsen and Rudel 2013).

The overall representation of Vietnam as a country that has gone through FT is modified when studying sub-national processes. We found that sub-national FTs are not easily detectable or comparable, since FT thresholds and land-use dynamics vary between provinces (and locations). The assumption about FT in Vietnam is that forest cover has increased nationally due to large-scale tree planting policies explained by forest and environmental scarcity (Meyfroidt and Lambin

2008). The study has shown that this is only part of the picture, and that a reality of multiple adaptations and institutional dynamics lie behind forest-cover data.

In addition, FT in Vietnam is highly influenced by policies. While specific forest-related reforms, such as planting forests in Bac Kan, have had an impact on the levels of forest cover, the general socio-economic policy reforms of the *doi moi* have probably had equal or even greater effects. The shift towards individual land rights combined with policies of agricultural intensification, completely changed land-use incentive structures that existed during the previous 'collective' era. The policy shifts implied less pressure on the highland forest lands and the abandonment of 'illegal' shifting of agricultural production to the more marginal lands (Castella and Dang 2002). By contrast, in Lam Dong, migration policies combined with policy incentives for market-oriented production of perennial crops, particularly coffee, have led to the expansion of agricultural production into forests. These changes must be understood within the larger picture of government control and the development of the NEZs, and cannot be reduced to simplified dichotomies related to the 'poor' and the 'ethnic'.

In Vietnam, various institutional reforms have been carried out with resulting implications for long-term land use and landscapes. The nature of such reforms must again, however, be seen as context specific and the result of negotiations between actors with multiple interests and identities. In this way, 'landscapes, over time [...] may come to embody layer upon layer of the legacies of former institutional arrangements, and of the changing environmental entitlements of socially differentiated actors' (Leach, Mearns, and Scoones 1999:239).

Both papers dealing with livelihoods demonstrated the limitations of one-dimensional explanations and dichotomies about the drivers of change and land use that tend to permeate forest policies and land-use discourses in Vietnam. In Lam Dong this is particularly related to perceptions about differences between the 'poor' versus the 'rich', and the ethnic 'minority' versus the 'majority'. Here we questioned the scale of deforestation attributable to small-scale farming activities, as was the assumption that the 'poor' cultivate more 'marginally' and 'extensively' than the wealthier households. In Bac Kan the perceptions are linked instead to a 'forest-agricultural' divide and policy constructions of the types of activities that are normatively 'accepted' and those that are not within the various categories of land. However, when analyzing livelihood adaptations, simplified policy assumptions and constructions do not necessarily reflect the 'real' situation in

terms of what is happening on-the-ground. The study found that forest land use is not limited to conventional forestry activities and the extraction of non-timber forest products. We identified multiple adaptations to the use of forest lands, including various forms of subsistence and market-oriented agricultural production. The findings may have important implications for how policy reforms such as REDD+ construe and target drivers of land-use change, and policy developers and implementers should develop incentive structures and opportunity cost scenarios for alternative land uses.

In conclusion, the study highlights the risks involved in applying ‘one-dimensional’ and ‘reductionist’ models of the drivers of forest transitions in policy development. Such one-dimensional explanation models and policy frameworks are not endemic to Vietnam, but seem to permeate the whole global REDD+ debate, influenced by predominant discourses of *ecological modernization* and *green governmentality*. Within the predominant discourses of REDD+ (that is compensating actors of change – for example nations, companies and individuals – for reducing forest encroachment and/or planting more trees), lies the potential to search for clear-cut and simplified definitions of who the ‘actors of change’ are. Policies do not develop in voids free of agendas and multiple interests of more – or less – powerful actors. In Vietnam, this has created grounds for reproduction and ‘path dependencies’ of existing institutional structures. The study has also demonstrated the complexities of attempting to define the motivations behind land use and land-use change processes in two different areas of Vietnam. Even though ‘not cutting down trees’ and ‘planting more trees’ may seem like simple and alluring solutions for mitigating the global challenges of climate change (through REDD+), on-the-ground realities demand context-specific, multilayered and participatory solutions in order to efficiently, effectively and equitably target the issues and interests at stake.

7 References

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PART II:
Compilation of papers

Paper 1



Analyzing the transformations of forest PES in Vietnam: Implications for REDD +



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ABSTRACT

This paper applies a critical institutional framework to analyze the transformation and path dependency of market-resembling environmental policy processes, exemplified by the implementation of forest PES in Vietnam. Here PES did not enter an institutional vacuum, but was rather transformed through a process of reproducing existing institutional structures. This partly reflects established norms and values about 'best-ways' of organizing forest management, but also existing structures of power, tenure and some groups' control over forest resources. In this sense, from a path dependency perspective, the new and 'innovative' market-based approaches, such as PES, do not represent 'critical junctures' with profound impacts on the future trajectory of forest management. The findings may have important implications for the prospects of implementing similar initiatives, such as REDD +. Future schemes of PES and REDD + should hence to a higher degree take into account the limitations and challenges of institutional reproduction, interplay and path dependency in their planning and implementation.

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1. Introduction

Over the past 20 years numerous new types of market-based policies and instruments for meeting the global environmental challenges have been suggested (Vatn, 2011). Multiple strategies have been put forward to identify and monetize the services that ecosystems provide to society (UNEP, 2010; TEEB, 2009). Schemes on Payments for Environmental Services (PES) are based on the notion that due to the public good nature of these services, there might be buyers somewhere that could pay for these goods continuing to be delivered instead of being exploited or degraded. PES can be understood as combinations of various economic policy measures and instruments for sustainable provision of environmental services (e.g. water, energy, biodiversity, carbon) and have during the past 10–15 years been tested in different contexts and scales (Wunder, 2015). A well-known large scale PES-like initiative is the global climate mitigation efforts for reduced emissions from deforestation and forest degradation (REDD +) (Corbera, 2012).

This study aims to advance knowledge on the multiple challenges of implementing forest related PES, taking the case of Vietnam. During the past ten years new market-based approaches of PES, and more recently REDD +, have been introduced to promote more efficient and equitable forest management in Vietnam (Pham et al., 2013). There are currently numerous PES projects being implemented or in planning stages in the country (McElwee, 2012; To et al., 2012). More recently, strategies and

capacity building for REDD + are also being established (cf. UN-REDD, 2012; SRV, 2011).

The point of departure for our paper is that new environmental policy schemes seldom enter into pristine institutional policy terrains, but will be exposed to a multitude of existing institutions that historically have emerged and evolved within their respective settings (Vatn, 2005). Such institutional interplay between new and existing arrangements will greatly impact the planning, implementation and prospects for any environmental policy schemes, such as PES or REDD +. There has been a growing attention and understanding of the forces of such interplay impact on the new policies and prospects for institutional change (Young, 2002; Pierson, 2000; Mahoney, 2000; Campbell, 2010).

The main objective of the paper is to investigate how PES as a policy framework has been transformed in planning and implementation at multiple governance scales, and to reflect upon its implications and prospects for REDD +. We conduct policy and institutional analyses of reform processes of moving from traditional state control of tropical forests to more recent market-resembling approaches, exemplified by schemes for PES implemented in the forestry sector of Vietnam.

2. A framework for the analysis of PES

2.1. Payment for environmental services: concepts and criteria

PES as a policy approach goes back to the 1990s (Cómez-Baggethun et al., 2010; Wunder, 2005; Tacconi, 2012). No standard definition exists, and there are disagreements between different schools of

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thought on what PES is and should be (see e.g. Tacconi, 2012; Wunder, 2015; Somerville et al., 2009; Muradian et al., 2010). PES as an environmental policy approach has also been criticized by many for being based on oversimplified market-based and one-size-fits-all principles that in practice neither will solve environmental problems nor lead to improved livelihoods for local communities (Kosoy and Corbera, 2010; McAfee, 2012; Corbera et al., 2007).

In this paper, we do not take a position on definitions, but rather use one school of thought as a theoretical reference point to organize the discussion around Vietnam PES processes. In Vietnam, the PES policies that were developed can be related to an *environmental economics* definition of PES. In the paper we therefore use such a definition operationalized through Wunder's (2005, 2015) PES criteria as a point of departure for our analyses. In short, Wunder claims that in order for a project or program to be called PES it needs to involve a *voluntary* transaction between minimum *one service buyer and seller of a well-defined ecosystem service*. The transactions should also be *conditional*, implying that payments should be made 'if and only if the [environmental service] provider secures ecosystem service provision' (Wunder, 2005: 3). Wunder has recently revisited his own criteria (cf. Wunder, 2015). The most significant modification made in this revision is that conditionality is singled out as the most important PES feature. Further, it recognizes that environmental services cannot always be well defined, and that most PES agreements therefore are constructed around resource-use proxies rather than well-defined services. In addition, the terms 'buyers' and 'sellers' have been changed into 'users' and 'providers' of environmental services. In the paper we investigate how a PES model based on these criteria and their assumptions (Table 1) was transformed in the practical implementation. In doing so we apply theoretical insights inspired by institutional theory and path dependency.

2.2. Understanding institutional reproduction and change – a framework for understanding the path dependency of PES

Institutions that deal with environmental governance issues are commonly known as resource regimes (Young, 2002). In our paper we consider the emergence of PES as the introduction of a new resource regime, hence a purposeful institutional change. In conformity with Young's (2002) theory, we consider the interplay between resource regimes and actors at multiple scales being the key to understand policy implementation processes. Processes of introducing new resource regimes, such as PES, will evolve in an interplay between different actors and institutions at multiple scales, ranging from the international, national, regional and down to local scales (Young, 2002). A seminal factor for the prospects of any implementation of a new resource regime is therefore its encounter and interactions with institutions already in place. No new policy or regime will enter an institution-free domain, and hence, there will be different forces of horizontal and vertical interplay with already existing institutional arrangements (Vatn and Vedeld, 2012). These could include existing property structures, norms and 'appropriateness' of environmental behavior. There will also be different reality contexts in time and space, and the selection and introduction of

policy instruments will consequently be determined by the actor that has the right to handle the issue and what 'reality models' that are predominant at the given time. If the new model goes across predominant cultures and perceptions of appropriateness, this will often cause negotiations and adjustments of policies that will facilitate a smoother transition into a new regime. Such interactions will often lead to unpredictable and complex hybrid resource regimes of institutional bricolage (Cleaver, 2012).

In certain situations, policy reform processes seemingly lead to the reproduction of already existing structures and institutions. Such institutional reproduction can be described as *institutional path dependency* (Pierson, 2000). In short, path dependency describes the tendency of human-systems to follow well-defined courses once launched on particular paths (Young, 2002). Following Mahoney (2000: 508), institutional path dependency could be seen as "contingent events that set into motion institutional patterns or event chains that have deterministic properties". This could refer to conservativeness or 'stickiness' of institutions, but could also involve trigger mechanisms of reproduction that are capable of seizing opportunities provided by such contingent events. Many path-dependency scholars, such as Collier and Collier (1991), Peters et al. (2005) and Sydow and Schreyögg (2010), are concerned with so-called 'critical junctures' of institutional development. 'Critical junctures' here refer to moments in time when the decision of the adoption of an institutional arrangement from amongst two or more alternatives is made (Sydow and Schreyögg, 2010). These moments in time are considered as critical since it becomes progressively difficult to return to the initial point where multiple alternatives were available (Mahoney, 2000). At the same time, complete transitions and turnovers are rare, and the legacy of 'old' systems must often be taken into account (Collier and Collier, 1991). Critical junctures therefore pave the way for future path dependency.

Within path-dependency theory often lies the assumption that "policymaking systems tend to be conservative and find ways of defending existing patterns of policy, as well as the organizations that make and deliver those policies" (Peters et al., 2005: 1276). Pierson (2000) refers to mechanisms of institutional reproduction. There are different theoretical perspectives on what such mechanisms consist of, ranging from rational actor perspectives to more structural and power oriented explanations (cf. Pierson, 2000; Mahoney, 2000). The perspective we take in this paper is that institutions are social constructs, including their rules, norms and conventions that shape, and are being shaped by actors (Vatn, 2005). Institutional reproduction hence takes place as result of the interplay between the interests, norms and value systems of various institutional structures and the actors within these. Implicitly it is important to recognize that individuals often relate to different institutions, and hence, have complex institutional identities that guide behavior and decisions (Cleaver, 2012). For example, government officials working in regional or local contexts will simultaneously be shaped by local institutional structures' norms, values and 'reality models'. And, importantly, it is in the interaction between these different structures that the social transformation of policies takes place. In the paper we look at how the interplay between various institutional structures at multiple levels caused social transformations of PES policies that seemingly led to a 'path-dependent reproduction' of already existing values, conventions and norms/practices of forest management.

3. Methods and study area

The study looks at Vietnam and we have selected Lam Dong Province as a case study area (Fig. 1). This is firstly because Lam Dong has been one of the two pilot provinces for the Vietnam PES scheme (the Province of Son La is the second one), and it is also a pilot province for the national REDD+ program. Secondly, Lam Dong harbors large areas of intact tropical forests, while still experiencing both deforestation and forest degradation. Since the early 1990s, deforestation rates have decreased and the country has currently a positive net forest-cover change (FAO,

Table 1
Key operational criteria of analyzing PES processes.

Criteria	Key assumptions
Conditional	Rational actors guided by the objective of maximizing their own benefits
Voluntary	Providers and users participate in PES scheme by consent and own interest
Clear ES or proxy	Observable results in terms of environmental results/benefits available
Clear user/provider relationship	Relationships between environmental managers (providers) and consumers of environmental services (users) clearly defined

Sources: Wunder (2005, 2015), Vatn (2010), Tacconi (2012).



2011). Nevertheless, despite the general positive trend, there is still substantial local variations in forest-cover dynamics within the country. The Central Highlands (including Lam Dong) has been the area of greatest concern (see e.g. SRV, 2011; Holland and McNally, 2010; SNV, 2010). Reports indicate that the forest cover here decreases by 0.23% annually (Long and Vu, 2011).

The Central Highlands, of which Lam Dong is a part, is predominantly populated by various ethnic minority groups that have practiced shifting agriculture and seasonal migration. The people living in the two communes of this study were mainly of K'ho ethnicity. The ethnic minority groups of the Central Highlands have historically been subject to processes of marginalization mainly to economic activities and intentional settlement campaigns carried out by the more numerous and powerful Vietnamese (*kinh*) people (Salemink, 2003).

The study has applied a mixed-methods approach, including in-depth interviews, reviews of policy documents and a survey. A total of about 30 in-depth interviews were held with state officials at national, regional and local levels, and also NGO representatives, researchers and donors. These were selected based on consultations with various stakeholders within the UN system, in the Ministries and the NGOs. Based on the initial interviewees' recommendations further interview objects were selected, according to the principles of *snowball sampling* (Goodman, 1961). The in-depth interviews were carried out to acquire insights in different perspectives and stories behind the development and implementation of forest sector management, PES and REDD+. The paper also draws upon information collected from a household survey carried out in 100 households in two communes in Lam Dong.

The household survey interviews brought insights into general perceptions and experiences with PES in the communities. In the study we have attempted to triangulate data from different sources including in-depth interviews with government officials at different levels, researchers, NGO-workers, survey interviews and secondary data. Reviewing past and current policy documents gained knowledge about forest policy development in the country. Historic reviews provided insights into the history of environmental management, agriculture and ethnography of the region. Understanding the historic backdrop of the forestry sector and its reforms provides us with an understanding of the institutional landscape in which PES was introduced in 2008 and how it influences the future landscape.

4. Navigating the political and institutional forest landscapes of Vietnam

Major changes took place in forest management after Vietnam's independence from French colonial rule in 1945 (see Table 2). Even though forestry discourses in Vietnam are complex consisting of several subgroups and directions (Dang et al., 2012), we still consider two historic events as being particularly important and 'critical junctures' for the management of forests in Vietnam. This in turn leads us to the question of whether a third shift is underway with the new mechanisms and market-based approaches being introduced through schemes of PES and REDD+.

During the post-colonial period all Vietnam's forests were nationalized, and came under the control and management of State Forest Enterprises and Forest Management Boards under the Ministry of Agriculture and Rural Development (better known as MARD; hereafter referred to as the Ministry of Agriculture) and provincial authorities (To et al., 2012; McElwee, 2012). The nationalization of the sector did, however, not unfold uniformly. The process started in the north of the country, and continued in the south after the American (Vietnam) war and the reunification in 1975 (Dang et al., 2012). At its peak there were about 400 SFEs in the country. The SFEs were initially responsible

for all official logging activities in the country in the post-colonial era, while the local communities that used to manage and use the forests before the nationalization received little or no financial remuneration (McElwee, 2012).

The early 1990s saw a second shift that can be viewed as a 'critical juncture' for forest management in Vietnam. The mainstream perception is that these reforms took place as a result of the government's recognition of the ineffectiveness and the environmental unsustainability of the forest management in the country. The reforms can also be linked to a process starting in the 1980s of transforming the economy into "a market economy with social characteristics" (Kerkvliet, 2005; Dang et al., 2012). This took place over more than a decade in different pace and ways across sectors and regions, moving from plan to market, collective to family production, and from state to private land management. The forest sector reforms followed a process of decollectivization and a transition to more market oriented principles that had already started in the agricultural sector in the late 1980s. The early reforms of the agricultural sector derived to a high degree from 'everyday resistance' amongst farmers against the ineffectiveness of the collective model (cf. Kerkvliet, 2005). The shift did, however, not unfold in a unilinear and uniform fashion, and it involved both opposition and resistance to the reforms both within the state bureaucracy and the government ministries (ibid).

The forestry sector reforms included forest tenure reforms, stimulation of forestry-based incomes and market integration, and forest protection and plantation programs, referred to as the 327 and the 661 programs (the 661 program is better known as the 5 Million Hectares Reforestation Program (5MHRP)). The processes also included efforts of devolving decision-making and forest land rights (Nguyen, 2008; Sikor and Nguyen, 2007; Bayrak et al., 2013). The changes that took place were gradual, and included series of new laws, regulations, decisions and decrees related to forest land rights, forest production and protection (Long and Vu, 2011).

The new land-law of 1993 supported downscaling state control and increased household management of forest land. These processes have, however, unfolded unequally in different parts of the country. The dominant forest owners in Vietnam today are still the state entities represented by the State Forest Enterprises, Management Boards and the army (Nguyen, 2008). Even though the number of Forest Enterprises has been decreased from 400 to 143 today, they still play a dominant role in forest management in the country, especially in the Central Highlands. The Lam Dong Province is amongst the provinces with the least household-managed forest land. In view of this the legacy of state-led forestry period to a high degree must be taken into account, especially when looking at forest tenure.

The forest reforms also implied a new national forest classification system, categorizing forests into *production*, *protection* and *special use* forests. The Provinces of the Central Highlands, where large areas of natural forests are considered intact, have a relatively higher share of protection and special use (national parks) forests than most other provinces. As part of the reforms in the Central Highlands, systems of communal forest protection were established to protect and manage the areas of protection and special use forests owned by the Forest Enterprises and Management Boards (Dang et al., 2012). The forest protection groups are still functioning, and, as we shall see, have become important for the institutional setup of PES in the local communities.

A third shift can arguably be observed in the 2006–2020 Forestry Development Strategy, which emphasizes the importance of 'market mechanisms' for the sustainable development of the forestry sector. This was preconceived by a pilot scheme for PES in 2005, and resulted in a national program for PES in 2010. The last innovative mechanism being planned, designed and piloted within the forest sector of

Table 2
Events and critical junctures in the history of the forest sector and related forest cover transitions in Vietnam.

Year	Event (Critical junctures)	Forest transition implications	Forest-cover transitions
1945	Independence from France		43.0%
1955–1975	Gradual nationalization of forests: State Forest Enterprises and Forest Management Boards	–State-led logging –Unclear tenure and open access –Large-scale illegal logging	
1955–1975	US War		
1975	Unification between North and South		
1990	Forest sector and tenure reforms	–Regulation and ban on logging –Reformed forest classification and tenure system –Large-scale planting of trees	28.8%
1991	Law on Forest Protection and Development		
1993	New land law for forest Program 327 (“Regreening Open Land and Barren Hills”)		
1997	Decision 661 (5 Million Hectares Reforestation Programme)		
2001	National Forest Development Strategy (NFDS, 2001–2010) Forest Sector Support Program and Partnership (FSSP)		
2004	Multi-donor Trust Fund for Forests (TFF)		
2005	Decision 380 (PFES pilot program)		
2007	Approval of 2006–2020 Vietnam Forest Development Strategy		
2008	Vietnam Forest Protection and Development Fund (VNFF)		
2010	Decree 99 on National PES Programme	–A new shift?	39.7%
2013	UN REDD Programme Phase II		

Sources: Long and Vu (2011), Salemink (2003), UN-REDD (2012).

Vietnam is REDD+. Current REDD+ activities include capacity building, the setting up of a benefit-distribution system for channeling funds down to household levels, establishing a national system for Measuring, Reporting and Verification (MRV), and mechanisms for addressing social and environmental safeguards. REDD+ in Vietnam constitutes today first and foremost a pilot scheme supported by the UN REDD Program, involving activities in six pilot provinces (including Lam Dong) that are meant to represent the diversity of the country in terms of sociological and ecological factors. The way REDD+ is being planned within the forestry sector shares much affinity with PES, and within the Decree 99, which officially established the national PES program, carbon sequestration is defined as a forest service. The REDD+ program documents also foresee using already established institutional structures such as the Vietnam Forest Protection and Development Fund (VNFF) for managing, coordinating and channeling of funds. The question is still whether these new mechanisms, structures and approaches represent a new critical juncture for forestry management in Vietnam. In the following chapter we review the introduction of PES in Vietnam by applying concepts from critical institutional theory to analyze the path dependency of these processes.

5. Results and discussion

5.1. Introducing PES in Vietnam

Since about 2005, the Government of Vietnam has been exposed to the idea of PES. PES was introduced to Vietnam by some international organizations. These included Winrock International and the German Agency for International Cooperation (GIZ), SNV and the International Union for Conservation of Nature (IUCN). Financially the process was supported by USAID. Their motifs were to test and implement a large scale PES policy in the country. The prospects for implementing PES in Vietnam were by many described as meager considering the long tradition of command-and-control policy approach and management culture in the forestry sector (see e.g. Wunder et al., 2005). The point of departure of the PES framework was very much in line with an environmental economic way of thinking, including an intention of establishing a voluntary and performance-based mechanism, with clear provider-user relationships and clearly defined environmental services.

The global actors actively promoted the idea of PES towards the Government of Vietnam. In the process, Winrock International facilitated a study trip for government officials to visit PES projects in the United States. The delegation included representatives from different Ministries, including Agriculture, Environment and Culture, Sports and Tourism, in addition to representatives from other countries in the region. The delegation visited sites that offered different examples of how PES could be implemented in practice, including eco-tourism (Hawaii), sustainable fish stock management (Oregon), and watershed management (New York). The delegation took special interest in the watershed model. A perception seems to have developed at government level that the watershed model would be the most appropriate one for Vietnam, and that the management and the supply of water for consumption and energy was about conserving upstream forests. Similar ideas seem to permeate many organizations, and conveniently fit into an existing and taken-for-granted narrative about the importance of conserving and planting new forests for the sustainable management of forests and the environment in Vietnam. The ‘forest-water’ narrative also supports the status-quo of the institutional setup of forest management in the country, and the control over forests and its resources vested within the Ministry of Agriculture and Forestry.

Selecting the watershed and forest management model also made sense from an economic perspective. Several informants claimed that the GoV viewed PES as an alternative source of funding to a forestry sector in a financially challenging situation. At the time PES was being introduced, the state budget allocations to the forestry sector were being reduced, and the government searched for alternative sources of funding. Nevertheless, there were still some internal disagreements and discussions within the GoV on the institutional setup of PES in the country. A phase of lobbying towards - and negotiation within - the government took place. One of the representatives from the NGOs involved, described the process as challenging, demanding a lot of ‘persuasion, convincing and negotiations’:

“Above all it was difficult to balance the different interests of the two ministries. While MONRE [Ministry of the Environment] mostly considered PES from a biodiversity perspective, MARD [Ministry of Agriculture] was concerned with forest management and production.”

The international partners related mostly to the Ministry of Agriculture, perceiving it to be the unit with the most experience, skills and infrastructure in the field to implement PES in practice. They therefore

lobbied towards the Government for the Ministry of Agriculture to become the responsible PES unit. The process did also result in the Ministry of Agriculture as the unit responsible. This also explains why the national PES program in the end was reduced to forest environmental services, and got the PFES acronym (Payment for Forest Environmental Services) (PES hereafter referred to as PFES in the paper). At later stages the Ministry of the Environment has established its own PES program, based on activities and incomes mainly related to ecotourism. The scale of this program in terms of funds and activities is, however, limited (44,000 USD in 2012) (Pham et al., 2013).

In summary, establishing PES within the Ministry of Agriculture set the stage for the further policy development and the path dependency of PFES implementation in Vietnam. The institutional establishment of the PFES within the Ministry of Agriculture was a result of a critical financial situation and control of resources in the sector; taken-for-granted perceptions about the rationale of using already established structures for managing forest resources on the ground; in addition to norms and narratives about the links between conserving trees and managing water resources. Analyzing in more detail the path-dependency of implementing PES and the specific PES criteria implies looking at the interplay between national, provincial and local management regimes, where the different interests, norms and values about 'best ways' of organizing forest and watershed management are played out.

5.2. The PES model transformations in Vietnam

5.2.1. The voluntariness criteria

After the institutional setup was established within the Ministry of Agriculture, a PFES pilot scheme was established (SRV, 2008). This was financed by USAID through the organizations that had been promoting PES towards the government. At the outset the PFES was designed as a voluntary mechanism. According to NGO project staff and government officials, this proved difficult to operationalize in practice. Initially, information meetings were held between project developers, local communities (the providers) and hydropower and water companies (the users), in order to assure their voluntary participation. The users (the hydropower companies) were, however, reluctant towards participating. They expressed skepticism towards the idea that the consumers of electricity should pay additional tariffs. In the end, a forced additional tariff on electricity was enforced by the government. Hence, a return to time-tested approaches like stronger state involvement and more command-and-control according to 'old' principles became the way forward in the final decision to establish a national PFES Program in 2010 (SRV, 2010). Consequently, the voluntary and economic PES approach was transformed into a command and control administrative tax-resembling payment arrangement. In short, even though the government and other implementing bodies had the ambition of making the PFES voluntary, the lack of willingness to participate amongst some stakeholders caused the path dependency of known and existing top-down policy approaches.

5.2.2. The performance criteria

The PFES payments were also supposed to be conditional and paid according to the quality of the forest that the farmers managed. The quality of the forest was to be valued by a so-called 'K coefficient' (hereafter referred to as the 'performance factor'). The performance factor was based on the quality of the forest in terms of category (production, protection, special use), quality (rich, poor, intermediary), origin (natural or plantation) and human impacts (Chiramba et al., 2011). The performance factor was to be decided by the Provincial Peoples Committees based on the local conditions (Hoang et al., 2013). The interviews we carried out revealed, however, that in meetings held between the local communities and the provincial government in the planning phase, local people resisted the idea of some households receiving higher payments than others. Local people

strongly believe that households should be paid the same for the same type of work, regardless of the performance of their forest. According to key project staff and government officials, this reflects a history and culture of egalitarianism amongst the ethnic minority groups of the Central Highlands (see also Scott, 2009). This resulted in the provincial government giving up the idea of a performance-based PFES, and went for a 'flat rate' strategy instead, meaning that all households received the same amount of payment regardless of the quality of the forest. It should also be noted that the provincial government probably also had an interest in not having to calculate the quality component of the forest, avoiding a costly and probably conflict-ridden exercise. This in combination with the norms and values of egalitarianism caused an apparent path dependency, following the existing direction and practices of forest management instead of the planned one.

As a consequence, the performance and market aspects of the PFES has been downplayed and payments are effectuated regardless of what is being done to the forest (see also McElwee, 2012). In this way, the PFES implementation, which was intended as a performance-based arrangement, now locally is frequently framed and referred to as a labor contract between the Forest Enterprises or Management Boards and the households. Even though households formally are allocated the responsibilities for a single forest plot, management is not an individual responsibility, but organized through collective protection groups, led by government forest rangers. This is a way of collectively organizing forest protection that was already established during the forest reforms of the 1990s, and was already well-established and known to the people and the government administration in the area. This practice could therefore easily be reproduced to facilitate the implementation of the PFES duties and distribution of benefits.

There were also other discussions as to how payments should be allocated provincially, further undermining the environmental conditionality criteria of the PFES. Some of the early discussions were related to the relative weighing of payments between the Forest Enterprises, Management Boards and individual households (McElwee, 2012). Other discussions revolved around how the payments should be distributed between households at local levels. Most ethnic minority households in the two communes receive payments through the PFES. In fact, the ethnic minority background seemed to be the only qualification criteria for receiving the PFES payments. In addition to a flat rate policy, the provincial authorities reportedly also decided that instead of appreciating the value of the forest, the poorer households should receive higher payments than the better-off ones (To et al., 2012; Pham et al., 2011). The household and commune official interviews revealed that PFES locally is perceived as a poverty reduction tool, and not primarily a tool for solving environmental problems. Interviewing the *kinh* households asking them whether they were part of the PFES or not would often be responded with:

"The PFES is not for the *kinh*, but for the poor ethnic minorities".

This can be interpreted as a reproduction of established cultural norms and values, and the interplay and power struggle between ethnic groups. In the late 1970s, the Vietnamese government initiated large-scale agricultural development and resettlement programs in the "New Economic Zones", including in the Central Highlands (Meyfroidt et al., 2013). These processes also involved forced migration of *kinh* people, and large scale confiscation of productive agricultural land, often leading to the marginalization of ethnic minority groups' productive activities. The perceptions of PFES as a poverty reduction tool for the development and benefit of the ethnic minorities, can be interpreted as a confirmation and reinforcement of the long established view on these groups as 'poor', 'uneducated' and 'underdeveloped' (cf. Saleminck, 2003; Scott, 2009). The PFES is formally meant to contribute to both assisting local communities and ethnic minorities out of poverty, but with a possible underlying and more subtle objective of transforming them into environmental protectors of the state (cf. Agrawal, 2005).

In summary, the conditionality criteria was to a large extent dismissed as a bearing principle because “it was not how things are and have been done” within forest management in the area. In addition, the power dynamics between different ethnic groups and narratives about minority groups’ need for development and their ‘inability’ to manage forests transformed the environmental conditionality into poverty conditionality instead.

5.2.3. User-provider relationship criteria

The forest tenure regime complicates the relationship between users and providers of environmental services in Lam Dong. Decree 99, under which the national PFES scheme is officially established, opens up for two alternative payment models for PFES:

- 1) Forest owner model: payments to legal forest owners and
- 2) Forest leaser model; payments to households, individuals or organizations that have protection contracts with forest owners.

The two different models have been developed to accommodate different tenure systems in the country. In Lam Dong, the leaser model is predominant as most land here is under state or state enterprise administration. Since most of the forest is owned by the government either directly through the Management Boards and the People’s Committees, or indirectly through the forest enterprises, and as the water and hydropower companies are parastatal, in many cases the state acts as user, provider and intermediary of environmental services. In the leaser model the contracted household entities do not have a formal say in elaborating the contracts. The PFES contracts are prepared by the forest owner and signed by the Commune’s People’s Committees. The leaser model is much in accordance with the old ‘protection contract’ system of the 5MHRP, except that payments now are higher than they used to be and that the contracts in principle should be longer than one year.

The forest tenure regime has hence had profound impacts on the structure and setup of the PFES policies in Lam Dong. In Lam Dong less than 2% of the classified forest land is managed by individual households, while the Forest Enterprises and the Management Boards control more than 78% (see Table 3). By contrast, in a province like Bac Kan more than 30% of the forest land is managed by households (MARD 2011 presented in UN-REDD, 2012). The ‘stickiness’ of the tenure system in the Central Highlands is by many claimed to be linked to the fact that the forest resources here are still of high value, giving the state entities a vested interest in maintaining their control over the resources. A perception seems to have developed that households, and ethnic minority households in particular, are not capable of managing forests sustainably. In interviews with government officials and others, many would argue that the concrete experiences with testing individual management of forest land have demonstrated that local people will cut forest and some even sell it forward to private interests. Such well-established institutionalized narratives seem to contribute to the reproduction and cementation of old tenure structures and state-led approaches to forest management in the Central Highlands. Again,

Table 3
Groups/entities responsible for managing forests in Lam Dong.

	Responsibility areas	Area (ha)	Share (%)
State-owned companies	Protection and production forest	197 558	32,9
Households	Production forest	10 733	1,8
FMB	Protection and special use forest	273 242	45,5
Peoples’ committees	Protection and special use forest	1 658	0,3
Village communities		0	0
Joint venture enterprises	Production forest	18 271	3,0
Army	Production forest	98 300	16,4
Other		1 445	0,2
Total		601 207	

Source: Table adapted from UN-REDD (2012).

control over forest resources and established norms and perceptions about the ethnic groups’ ability to manage forests block forest tenure reforms and in turn also transformational forest management reforms. This seemingly causes a reproduction and path dependency of existing institutional structures in the study area.

5.2.4. What are the services of the PFES?

The use of market mechanisms in the forestry sector are enshrined in the 2006–2020 Vietnam Forest Development Strategy, and the PFES should be viewed as being an integral part of this. The strategy contains multiple objectives, including social, economic and environmental ones (cf. SRV, 2007). Seemingly, this also permeates perceptions of what the objectives and approaches of the PFES program should be. The importance of PFES as a tool for poverty reduction and as an alternative income source to the forestry sector was frequently highlighted in interviews with government officials, donors and NGOs both at national and provincial level. As expressed by one donor representative:

“To me it [the PFES] is just another social program for reducing poverty”.

The existing resource regime outlined in the forestry strategy has influenced the design and implementation of the PFES in the country, partly explaining the institutional reproduction of existing practices of forest management through the PFES. The values of forests as key sources of income for rural communities and ethnic minority groups as expressed in the forestry strategy have hence had profound implications on the path dependency of PFES in Vietnam.

Overloading PES with multiple objectives could be a risk factor for attaining the main environmental objectives of PES schemes (Wunder, 2008). Arguably, this is also the case with PFES in Lam Dong. The documented effects on deforestation rates are sketchy, much less so the effects on water provision (which is being questioned by a number of studies, such as Hamilton and Pearce (1988)). The reported success of the PFES in Vietnam seems to be based on the scale, scope and level of payments in the pilot areas, rather than documented effects on the environment. The value of the PFES program in terms of being an economic incentive for changed behavior is uncertain. The level of awareness amongst households on the rationale of the PFES is extremely low. In the communes where this study took place only 17% of the households responded that they understood why they received the PFES money. Of these only 7% could give more in-depth explanations, linking forest conservation to water provision. The PFES seems more than anything else to be a kind of local control mechanism, where farmers get paid for controlling each other on behalf of the state. As expressed by a Commune Official in Lam Dong:

“The forest protection [of PFES] has led to people becoming scared of entering the forest.”

The risks of local leakage also seem high. A substantial proportion of households still continue to expand coffee plantations in other areas, at the same time as they receive PFES money. Instead of clearing new lands for coffee plantations in the areas denominated for PFES (which in any case are relatively far away), most farmers seem to carry on business-as-usual on other forest land. The PFES might have some positive effects on the limited PFES areas, but does not seem to target the underlying causes of conversion of land into agriculture. This may be a major reason why reviewing the PFES experiences from an institutional path dependency perspective might be of value when looking into the prospects of using it for REDD+.

5.3. Summing up

The PFES has so far had few transformational effects on forest management in the province of Lam Dong. The limited effects have been a result of an interplay between values, norms and interests of

Table 4
Summing up the path dependency of PFES in Vietnam.

Criteria	Path dependency factors
Performance based	–Culture of egalitarianism – same payments to all regardless of environmental ‘results’ –Values of collectivism – existing collective patrolling system applied to organize and distribute PFES benefits
Voluntary	–‘Command and control’ – resistance against increased tariffs caused government to apply time-tested, top-down, tax-based approaches
Clear ES or proxy	–Poverty and income – forestry sector value/norm/perception about forests as sources of income and poverty reduction causing the ‘poverty factor’ becoming the main ‘performance’ criteria
Clear user/provider relationship	–Narratives about who is able to manage forests sustainably cementing existing forest tenure structures causing unclarity in user/provider-relationships in the PFES scheme

institutional structures and actors at multiple levels, seemingly causing the reproduction and path institutional dependency of the existing forest management regime. Both values and norms of the old communist command-and-control phase and from the reforms of the 1990s are still predominant within the forest sector of Vietnam (Table 4). So far, the policy-shift towards market-based approaches can therefore not be considered as a new ‘critical juncture’ in the management of forests of Vietnam and the Central Highlands.

6. The PFES implementation: implications and prospects for REDD +

Since 2010, approaches and plans for REDD + have been developed and tested in Vietnam. Lam Dong has been the pilot province for the testing of approaches for participatory MRV and Free Prior and Informed Consent. Key REDD + policy documents underline the importance of integrating and drawing upon the experiences and structures already established for the PFES. According to most government officials and other key decision-makers interviewed, there seems to be a general consensus that REDD + in Vietnam should be integrated in already existing frameworks and institutions, building on the positive experiences of reforming the forestry sector that started as early as back in the 1990s, continuing with the PFES in the 2000s. As expressed by one official in the Ministry of Agriculture:

“I think Vietnam already implements REDD + since we have been implementing activities for a long time. We have experience. Regardless of [a global mechanism for] REDD + being realized or not, we will continue. We will not wait for REDD + to be realized.”

The experiences with implementing the PFES in Vietnam also underline the importance of recognizing the institutional structures already in place in the planning and implementation. The review of various components of the PFES has revealed that instead of materializing the planned new and ‘innovative’ mechanisms and approaches, existing institutional structures have formed the actions and strategies of different actor groups to reproduce already existing management practices. It is probable that the same can happen with REDD +. One critical aspect of REDD + in Vietnam is the issue of free prior and informed consent (FPIC). Long-established values and norms of ‘trust’ in the state in development and governance will likely have profound impacts on the prospects of how inclusive these processes can become, at least in the short term perspective. The same counts for how REDD + can be developed beyond becoming another ‘poverty reduction’ mechanism, and create true incentives for addressing environmental and sustainability issues in the country.

But maybe most importantly, the case of implementing the PFES scheme in Lam Dong has demonstrated how the existing tenure regime has complicated a transformational change of access to key resources

within the sector. The vested interest of some groups’ control of forest resources seems to block further changes of the system. Unless REDD + recognizes key actors in the forestry sector and the strengths and weaknesses of already existing institutional structures and forces, there is a high risk of REDD + also reinforcing already existing inequalities, moving along the trajectory of ‘business-as-usual’.

7. Concluding remarks

This paper has drawn upon critical institutional theory to examine the path dependency of PES processes in the Lam Dong Province of Vietnam. The analyses have demonstrated that a perceived move from a command-and-control to a market oriented forest governance regime is complex and not straight-forward. PES has unfolded through an apparent path dependency of reproducing already existing institutions and approaches. In this regard, PES and other market-based approaches do not represent a ‘critical juncture’ in forest management in Vietnam.

What happened at the outset could be seen as a contingent event where the government needed to try alternative approaches to supplement and diversify incomes to the forestry sector. This was also in combination with a proactive donor and NGOs that were interested in promoting and testing PES at a large scale in the country. Practical policy development and implementation demonstrated, however, to a high degree an institutional path dependency of reproducing already existing norms and values of how ‘things should be done’ within forest management. The institutional placement of PES within the Ministry of Agriculture was based on perceptions of ‘appropriateness’ of institutional responsibility linked to watershed management. This led to a narrowing down of PES to only involve forest environmental services (PFES). In addition, the ideas of PFES as a voluntary market and performance based mechanism were further modified when introduced at regional and local scales. The environmental users in this context resisted voluntary participation due to the prospects of increased electricity tariffs. This resulted in the enforcement of a top-down tax-based model instead. The rejection of a performance-based PES was partly as a result of a general culture of egalitarianism amongst the ethnic groups in the local communities. In addition, the models of collective forest patrolling that in the end were applied also build on the norms and values of the existing forest protection and management regime.

Despite long-lasting reforms of decentralization of forest land, the state is still in control of most forest land in Lam Dong (and the rest of the Central Highlands). The low awareness of the rationales behind the PES program seems to increase the risks of local leakage and ‘business-as-usual’ practices. Rather than being an environmental service payment mechanism, the PFES is locally perceived as a labor contract for protecting the forest. The main function of PFES seems to be about ‘educating’ people about the value of conserving forests and mutual control of each other. The PFES hence seems to reconfirm old perceptions and stereotypes of highland ethnic minorities as underdeveloped, uneducated and, implicitly, also the forest destroyers. The PFES also seems to avoid important and sensitive issues of tenure, historic land grabbing and tensions between the upland ethnic minorities and lowland migrants.

On a positive note, some would argue the experiences with the PFES implementation demonstrate that the existing command-and-control structures to a certain degree buffer against a neoliberal development of the forest sector in Vietnam. Nevertheless, if REDD + is supposed to bring new and more socially inclusive forest policies, it still has to counteract the forces of path dependent institutional reproduction and replication of old structural inequalities. This would most likely call for major reforms in tenure and management structures at national and local scales. This is not an easy undertaking. Due to high transaction and management costs in combination with aspects of power, institutional norms and value structures, there is a great

risk of reproducing 'old' regimes. For REDD+ that is widely promoted as a vehicle to transformational shift towards performance- and market-based environmental governance, this will likely be a major challenge. Hence, future schemes of PES and REDD+ should to a higher degree take into account the limitations and challenges of institutional interplay and path dependency in their planning and implementation.

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Paper 2

Article (draft)

Sub-national forest transitions and policies in Vietnam

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Abstract

This paper compares forest transitions (FT), policy reforms and forest cover change in the Bac Kan and Lam Dong provinces of Vietnam. The country has seemingly been able to shortcut the perceived FT stages by quickly moving to the reforestation phase, which makes it an interesting case country. Provincial level forest cover and socio-economic trends are, however, not necessarily comparable and compatible within a FT analytical framework. Bac Kan is one of the poorest provinces, but has experienced forest regrowth and expansion of forest cover during the past couple of decades. In contrast, Lam Dong province has both higher GDP and population levels, but has had higher levels of deforestation, particularly linked to the expansion of perennial crops. This is quite contrary to what could be expected from a conventional FT hypothesis. The FT turnaround and land use dynamics were found to be linked to the overall and all-encompassing policy shift related to de-colonization, state-control and collectivization, and the *new shift* of “market-led socialism”, decentralization and land tenure reforms. The findings demonstrate that policies can trump typical FT patterns linked to general development trends. This provides a sense of relief in the way that the FT-trajectory is not unavoidable. Policies can make a difference. Yet, these policies have not primarily been guided by forest conservation concerns, but have rather been a side effect of economic development and political objectives.

1 Introduction

With the increased global efforts to reduce greenhouse gas emissions from deforestation and forest degradation (REDD+), the forest transition (FT) theory has been proposed as a framework to design appropriate conservation policies and measures at multiple scales (Angelsen and Rudel 2013). The FT suggests that forest cover change occur in stages closely linked to economic development and transformation processes. Vietnam is an illustrative example, as one of few tropical forest countries that over the past decades have experienced a net increase in national forest cover (FAO 2011) and gone through a FT (Mather 2007, Meyfroidt and Lambin 2009, Meyfroidt, Rudel, and Lambin 2010). This shift has largely been attributed to the large-scale reforestation and conservation programs carried out by the Vietnamese state in the 1990s and 2000s.

While Vietnam stands out as a successful example of forest rehabilitation (de Jong 2010), the processes vary across different regions of the country (see e.g. Meyfroidt and Lambin 2008). Forest cover and land use dynamics are highly place-specific, meaning that processes of both reforestation and deforestation can take place within the same country, making it difficult to talk about a national scale FT (Holland and McNally 2010). An interesting question therefore becomes to what degree the FT represents a useful framework for understanding forest cover dynamics and policy implementation at sub-national levels.

The two provinces analyzed represent contrasting stories of forest cover dynamics and change. While Bac Kan has had a net increase in forest cover, Lam Dong has experienced a net loss over the past 30-40 years. Can the two different trends be explained by forest scarcity and general structural and economic transformations, as highlighted in the conventional FT story (Rudel, Coomes, Moran, et al. 2005), or are these explained by national and province-specific policies and institutions, as highlighted by other scholars (Bray and Klepeis 2005)?

The paper is inspired by the *FT policy approach* framework of Angelsen and Rudel (2013). We discuss how - and to what degree - this is a useful framework for understanding regional forest cover dynamics and policy approaches. We analyze trends and changes, both in terms of economic development and general policies, in addition to targeted sectoral policies aimed to improve forest and agricultural management.

More specifically, the paper asks the following questions: (1) What are the dynamics and drivers of forest transitions at provincial levels in deforestation and reforestation zones in Vietnam? (2) How do different policies influence forest cover change and transitions? (3) What are the implications of the findings for the conceptualization of FT and policies for curbing deforestation and forest degradation and enhance forest carbon stocks?

The paper is organized as follows: Section 2 outlines the conceptual framework of the study, mainly focusing on the main underlying theoretical perspectives of the FT. Section 3 introduces the policy context of Vietnam and the two case study provinces. Section 4 presents the results, and compares and discusses the findings against the identified conceptual variables. Section 5 concludes.

2 Conceptual framework

2.1 Forest transition and its drivers

The concept of a *forest transition* (FT) was first introduced by Mather (1990). The early phases of economic growth and transformation, with low population growth, are characterized by low deforestation rates and therefore also high forest cover. As the economy and the population start growing, networks of infrastructure improve and become denser, and (previously) marginal forest areas become more accessible. As a result, deforestation rates increase and forest cover decline. Later, with growth in off-farm job opportunities and urbanization, as well as improved agricultural technologies and higher yield, more marginal agricultural lands are abandoned and some fields revert to forests. The *turnaround*, where reforestation and afforestation overtake deforestation, and forest cover starts increasing, is what characterizes the FT.

Even though the model was initially developed to describe the historical forest cover development patterns in Europe and North America, numerous scholars have applied the concept to forest cover change in developing, tropical forest countries. Some countries in Central America and South and East Asia have also experienced an FT in recent decades (e.g. Rudel 1998, Rudel, Bates, and Machinguiashi 2002, Rudel, Coomes, Achard, et al. 2005).

Critics of the FT claim that the theory is too generalizing, and not well adapted to analyzing deforestation processes in tropical countries (Perz 2007). They also argue that the theory's focus

on large-scale mechanism neglects important lower-scale household decision-making and local processes that are crucial to understanding the mechanisms behind the FT (Perz and Walker 2002). In addition, the theory uses a broad dichotomy – forest and non-forest – and therefore neglects the quality of the regenerated forests (Robbins, Hintz, and Moore 2010).

According to conventional theory there are two main paths leading towards an FT: the *economic development* and *forest scarcity* paths (Rudel, Coomes, Achard, et al. 2005, de Jong 2010). The two pathways are not mutually exclusive, but rather complementary and mutually reinforcing. In short, the *economic development path* suggests that economic development brings higher off-farm income opportunities and therefore higher agricultural labor costs, which – combined with higher agricultural productivity – leads to the abandonment of agriculture on marginal lands, less pressure on forests and eventually the regrowth of forests. This argument is associated with Borlaug hypothesis, which claims that improved technologies and intensified production in the high-productive areas take pressure off marginal lands and forests (Angelsen and Kaimowitz 2001).

The *forest scarcity path* proposes that, with less forest, the demand for and value of timber and other forest products will increase. This could be an incentive for both better protection of forests against agricultural conversion, as well as expanding forest area either through natural regrowth or through planting (Figure 1). (Angelsen 2007, Satake and Rudel 2007, Angelsen and Rudel 2013). Within this framework, the forest transition can be viewed as a race between the agricultural rent and the forest rent (Angelsen, 2007): an increase in the agricultural rent (e.g., a new road) starts the deforestation process and then economic development reduces (the increase in) that rent, while forest scarcity boosts the forest rent.

Angelsen and Rudel (2013) extend this literature and define five possible drivers of the FT, which is partly splitting the forest scarcity and economic development paths, and adding policy changes in response to these. The drivers include: (1) the scarcity of forests, as a result of shrinking forest stocks and increasing demands; (2) scarcity of environmental services, that is (perceived and real) links between forest loss and environmental services, such as flood and erosion control; (3) diminishing agricultural rents from continued deforestation due to either longer distances and lower soil fertility on marginal lands; (4) economic development and structural changes, implying increasing (labor) production costs, changes in demands of forest and agricultural products; and,

finally, (5) policy changes, including both (forest and agricultural) sector specific policies (e.g., direct lands use regulation, taxes and subsidies) and general policies (e.g., tenure and institutional reforms). In the paper we investigate to what degree these drivers can explain the development in our two study provinces.

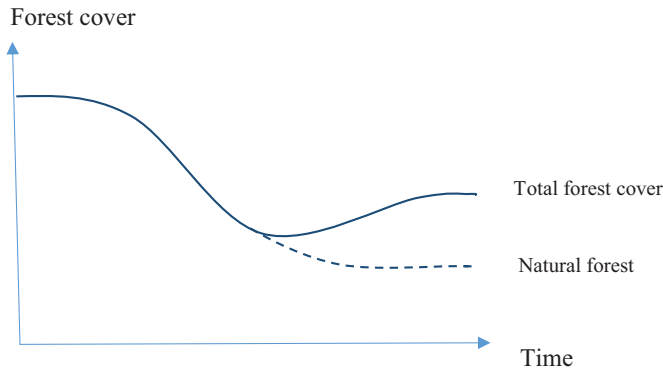


Figure 1. Forest transition curve and (potential) regrowth dynamics.

While mainstream FT studies have tended to focus on national level forest cover dynamics (Mather 1990, Rudel 1998), recent studies of FT processes in Southeast Asia have claimed that FT is a more appropriate framework at higher levels than the national and sub-national ones (Meyfroidt, Rudel, and Lambin 2010). Lower deforestation in Vietnam can be linked to more deforestation in neighboring countries, including Cambodia and Laos (Meyfroidt and Lambin 2009), and international trade can bring about a “globalization of the forest transition” (Angelsen and Rudel, 2013). This paper goes, however, in the opposite direction and asks whether – and to what extent - sub-national changes in forest cover can be understood well within a FT framework.

2.2 A broad FT vs. local factors and policies

Processes going on at sub-national scales are highly diverse and hardly captured by wide generalizations about forest cover dynamics (Rudel, Bates, and Machinguiashi 2002, Perz and Walker 2002). Diverse empirical evidence demonstrates the importance of taking contextual and

historical conditions at subnational scales into account in understanding forest cover dynamics (Aguilar-Stoen, Angelsen, and Moe 2011, VanWey, D'Antona, and Brondizio 2007, Sloan 2008). Historic land use dynamics, tenure and land distribution, often set the stage for the changes in forest cover (Aguilar-Stoen, Angelsen, and Moe 2011). Several other forest cover pathways are possible, including pathways governed by policies, globalization and smallholder intensification (Mather 2007, Lambin and Meyfroidt 2010). Empirical evidence from Asia demonstrates that FT is possible when per capita income is still low, and that government policies have played a major role in moving FT forwards (Mather 2007, de Jong 2010). The interactions between forest cover, economic development and policies in FT processes seem hence to be highly context specific.

This critique also relates to deeper epistemological debates: to what extent are broad theories, such as the FT or the demographic transition, useful frameworks even if they by their very nature ignore many factors and local variations. At one level, the FT predictions are sufficiently vague to never be wrong: they do not specify for how long the initial stage of high forest cover will last, the speed of deforestation, the minimum forest cover (which ultimately is zero), nor how much forest cover that will be recovered. Moreover, if one claims each space has its own unique FT, comparisons and testing become difficult. Yet, we hypothesize that FT (with all the modifications discussed) could be a useful lens to analyze forest cover change, and critically discuss to what extent there is a FT pattern – and what factors are relevant – at subnational levels in Vietnam.

2.3 The role of policies in FT

The FT has also been used to frame discussions of key international development institutions (such as the World Bank) in relation to global forest cover dynamics (Chomitz 2007), and is also prominent in key documents for global REDD+ policies. Examples of such documents include the Meridian reports on options for REDD+ policies and setting of reference levels (which both were commissioned by the Government of Norway) (Meridian 2011). It is also found in much of the other literature published on REDD+ and deforestation (see e.g. Rudel, Coomes, Achard, et al. 2005, Angelsen 2007, Angelsen and Rudel 2013). In practical REDD+ policies, the setting of reference level for Guyana as the average between a low national and a global deforestation rate was justified by the fact that the country presumptively is at an early stage in the FT, and increasing deforestation can be expected in a Business-As-Usual scenario.

Angelsen and Rudel (2013) use the FT as an approach for organizing and identifying appropriate policy measures to the different stages and forest cover dynamics ('core forest', 'frontier areas' or 'forest-agricultural mosaics'). From the Angelsen and Rudel framework, certain categories - or main types of policies - can be identified. Here we distinguish between: (1) *general policies* related to, *inter alia*, economic development, urbanization, and infrastructure development; and (2) forest and agriculture *specific policies*. Broad categories of variables and their interconnections with forest cover are summarized in Figure 2. We use this framework to analyze the role of policies in the two study provinces.

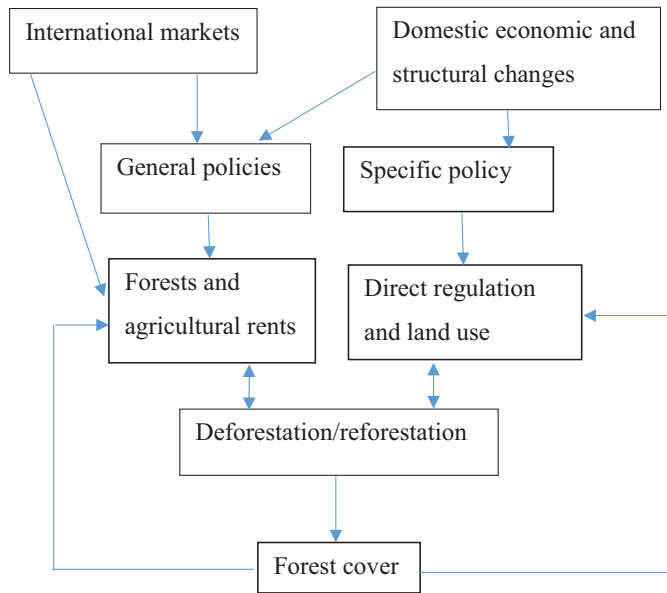


Figure 2. Model of forest transition dynamics and policy interaction.

2.4 FT, drivers of change and assumptions about policy effects

We use the conceptual model presented above to outline key predictions about drivers of change and policy levels at the sub-national level. We assume that forest and agricultural rents are influenced by a combination of factors of structural changes (e.g., demographic and economic change), and general and sector specific policies. In addition, sector specific policies may both

influence land and forest rents and regulate land use. Below we outline the assumed dynamics between factors of structural change, general and sector specific policies, and their potential impacts on land use and forest cover change.

2.4.1 Structural changes

Demography and technological change: Higher population densities are likely to increase forest pressure through higher demand for cultivable lands. The contrasting Malthus and the Boserup hypotheses take their turn along the FT (Angelsen and Kaimowitz 2001, Müller 2003). While population increases and forest cover loss go hand in hand in the early phases of FT in a Malthusian fashion, the occurrence of the FT suggests that farmers respond to increased population pressure and forest scarcity by intensifying production, in line with Boserup's induced technological change hypothesis (Angelsen and Kaimowitz 2001). Higher agricultural yield may take pressure off forests and other natural habitats, but the relationship is ambiguous (Angelsen and Kaimowitz, 2001). Depending on the market conditions, farming constraints and type of production and crops (market or subsistence), profit-maximizing farmers may look for more land to increase income. Subsistence oriented and labor constrained farmers may go for intensification instead of extensification.

We hypothesize that the 'frontier' and 'mosaic' areas are different in terms of demographic dynamics. 'Frontier' Lam Dong should have lower but more rapidly increasing population densities, while 'mosaic' Bac Kan has denser but lower population growth trends. Similarly, we hypothesize that Bac Kan has a higher share of population living in urban areas, as land scarcity would lead to a surplus of labor and movement of people seeking employment in cities. Nevertheless, agricultural intensification as a result of population pressure could potentially also increase the demand for labor if it implies labor intensive techniques, e.g., manual spreading of fertilizers and/or pesticides.

Economic growth: Economic growth is also hypothesized to have a mixed – and stage-dependent - effect on the FT trajectory. Higher income (i.e., economic growth) leads to higher demand for agricultural commodities, as well as infrastructure developments that stimulate deforestation in both the early and expansive 'frontier' phase. Later, better agricultural technologies and the growth in the off-farm sector – associated with economic growth – will slow down the deforestation processes. The effects on forest cover at this stage are, however, still potentially contradictory.

Higher labor costs and lower agricultural returns will lead to the abandonment of more marginal lands. Less forest may also increase the value of forest products, creating incentives to reforest and/or actively plant new trees (Rudel, Coomes, Achard, et al. 2005). On the other hand, higher values of wood products may lead to more harvesting of timber in natural forests and forest degradation.

Governance: Governance conditions are also assumed to change and influence forest cover dynamics along the FT (Angelsen and Rudel 2013). This is linked to, *inter alia*, government outreach, infrastructure development, relations between customary and statutory rights systems, administrative capacities. Better governance is, in the REDD+ debate, often assumed to be linked to forest conservation, by better enforcements of rules and regulations. But, the forest outcome depends critically on the types of policies; good governance can also make forest exploitation more profitable and policies for forest conversion more effective.

2.4.2 General policies

General policies refer to a wide group of laws and regulations and specific economic instruments (taxes, subsidies, etc.) with potential indirect implications for forest management and forest cover. These include, *inter alia*:

Market reforms: Vietnam has over the past decades moved from communism and a planned economy towards a market economy and an integration into global markets. The change may provide new agricultural opportunities, influencing also the incentives to clear forests. The impact forest cover on forest cover are mixed: agricultural export (e.g. through land expansion) could be stimulated, but higher demand for forest products may also provide incentives to plant more trees and let forests regenerate.

Infrastructure development: Construction of new and improvement of existing roads are likely to improve forests access and in turn increase deforestation. Road construction is maybe the single-most significant explanatory factor for deforestation across countries and contexts globally (Angelsen and Kaimowitz 1999). In later phases of the FT, however, infrastructure development might be a precondition for effective reforestation policies (Angelsen and Rudel 2013).

Devolution or decentralization: Decentralization has been key in Vietnam's general policy toolbox since the early 1990s. This refers to the transfer of decision-making processes, planning and other

rights to subnational levels. The documented positive effects of such policies on forest management are, however, scarce (Larson and Ribot 2009).

Tenure: Clarifying land rights and tenure is another policy approach assumed to have effects on forest cover trends. It may be an incentive for farmers to manage lands more sustainably and intensify production, and thereby reduce expansion into forests. On the other hand, tenure security may also be a precondition for expansion to claim new land (Alston, Libecap, and Mueller 2000).

Agricultural policy incentives: Agricultural subsidies and price policies may have strong effects on the incentives to deforest or not. Subsidies to intensify agriculture may increase land rents, again with dual effects on forest cover. More targeted policies, that subsidize deforestation-friendly products and tax deforestation-driving products, or focus on intensification in non-frontier areas, can help take pressure off forests (Rudel 2009).

2.4.3 Sector specific policies

Tree plantations: The scarcity hypothesis predicts incentives to plant more trees. Tree planting will increase forest cover, but the effects of reforestation policy on natural forest loss can still be ambiguous. It may relieve pressure, but it depends on what the drivers are (Sloan 2008). Scarcity of wood products may drive degradation, particularly in ‘frontier’ areas where property rights are unclear and the incentives for long-term forest management small. If forest degradation is related to the logging of certain high valued species, the planting of fast-growing exotic species is not likely to have any major positive effects on forest carbon stocks and biodiversity. Tree planting may also provide infrastructure and marketing opportunities that increase the demand for timber from natural forests.

Protected areas: Other policies assumed to have effects on the rates of deforestation are government-sponsored conservation, such as the establishment of national parks and measures to restrict human access to environmentally valuable areas. Nevertheless, the positive on-site effects might (at least in part) be offset by more pressure outside the protected areas (leakage) (Joppa and Pfaff 2010).

PES: The rationale behind Payments for Environmental Services (PES) schemes is that users (buyers) of environmental services compensate (pay) and provide incentives to the providers (sellers) for managing the natural resources at stake (Wunder 2005). Shrinking forest areas will

reduce the supply of forest-related environmental services. Forest related PES and REDD+ must be seen as responses to a the reduced supply of forest environmental services (e.g., saving forests to secure water supply and forest carbon) (Angelsen and Rudel 2013). Institutional factors such as clarified land rights are often assumed to be key to effective PES implementation (Wunder 2005), and such conditions are more likely to be found at the later ('mosaic') stages of the FT (Angelsen and Rudel 2013).

3 Policy context of Vietnam

3.1 The introduction of market-liberal reforms

Vietnam is one of the few remaining single-party communist states in the world. After the independence from France in 1945, the communist government of North Vietnam nationalized all land and cooperatives were established as the basic management units for agricultural production (Tachibana, Nguyen, and Otsuka 2001). The long history of communist cooperatives in the north makes the historical and socio-cultural setting quite different from the south (cf. Kerkvliet 2005, Meyfroidt, Vu, and Hoang 2013). The Central Highlands have since the Vietnam War¹ and unification been part of the New Economic Zones (NEZ) program implemented by the government to inhabit, develop and gain control over the central and southern parts of the country. The Central Highlands of which the Lam Dong province is part, has consequently been exposed to heavy immigration and colonization of land, mainly by the majority Vietnamese (*Kinh*) people from the north (De Koninck 1999).

After years of misguided collectivization policies, resulting in food shortages, hunger, and widespread resistance from the rural populations (Kerkvliet 2005), by the mid-1980s the Vietnamese government realized that time was ripe for a renovation of its economic policies. The shift is often referred to as *doi moi* - the 'new shift' (McElwee 2016). One of the main reforms was to shift certain productive assets from collective to individual control and ownership (Müller 2003). Agricultural policies were to promote market-oriented and intensified modes of production.

¹ In Vietnam often referred to as the American War, by others called the Second Indochina War (Salemink 2003).

Rice is the most important – both subsistence and commercial – crop in Vietnam. The production has to a large extent been characterized by small irrigated farms, multiple cropping and labor intensive practices (Minot and Goletti 2000). The *doi moi* reforms also changed the structure of rice production in the country. During the 1980s, fertilizer-responsive, high-yielding modern varieties were introduced (Tran and Kajisa 2006). This development first took place in the southern Mekong River Delta area, but over time, the innovations also spread to other parts of the country, including in the northern, lowland areas, where this study took place. As a consequence of de-collectivization and intensified production, rice production has risen dramatically since the early 1980s (Tachibana, Nguyen, and Otsuka 2001). The yields of modern rice varieties grew from about 2.0-2.5 tons per hectare in 1980 to 3.0-5.5 in 2002 (Tran and Kajisa 2006). In 2014, Vietnam was ranked the fifth largest rice producer globally (FAOSTAT 2014).

Commercial production of perennial crops has also boomed. Coffee production has been particularly important in the Central Highlands, where *Robusta* production has increased by a factor of ten since 1975 (D’haeze et al. 2005). The expansion of coffee production has had major implications for land use in Lam Dong. The reasons behind the expansion include the economic liberalization of the *doi moi*, large-scale resettlements to the Central Highlands, land reforms and extension policies, in combination with favorable coffee prices during the 1990s (Nhan 2001).

The *doi moi* also coincided with a public realization that the country’s forests were in poor conditions. Official data indicated that since 1945, the year of independence, forest cover had dropped from 43% to about 27% in 1990. This spurred a series of policy programs aimed to reduce environmental degradation and stimulate forest regrowth on ‘barren lands’. These included the so-called 327 and 661² reforestation programs. The 661 is also known as the 5 Million Hectares Reforestation Program (Long and Vu 2011). In both schemes, small-scale farmers were supported with seedlings and funds to establish tree plantations on bare lands. The main difference between the two programs was that in the 661 scheme, households were also provided with formal rights (*red books*) to the lands on which they planted trees (McElwee 2016). The official objectives of the reforestation schemes were to reforest the barren lands, and to provide households with additional income, and by that also reduce poverty levels (SRV 2007). Some claim, however, that

² The names 327 and 661 refer to Government Decision numbers (Long and Vu 2011).

the more subtle and hidden objective were to provide an emerging pulp and paper industry with stable and cheap raw materials (McElwee 2016).

The programs also contained components of forest protection. A national ban on logging was introduced in 1992. In areas where forests still were perceived to be under threat, households were encouraged to sign up for so-called protection contracts, implying that they were committed to participate in patrol groups led by government forest rangers. These ‘protection groups’ were to control illegal activities within the forests surrounding their communities.

The 1993 Land Law also opened up for forest land allocation to individuals, households and organizations, implying the rights to exchange (buy and sell), inherit, lease, and mortgage forest lands (Do and Iyer 2003, Long and Vu 2011, Bayrak, Tu, and Burgers 2013). In certain areas, structural conditions, such as the position State Forest Enterprises (SFE) also limited to what degree individual households received rights to forest lands (UN-REDD 2012).

Vietnam’s forests can be classified along different dimensions, according to type or use. These are *special use*, *protection* and *production* forests (SRV 2009). *Special use forests* include mostly national parks and areas set aside for special purposes, such as for research and tourism. *Protection forests* provide special types of services such as soil protection, water provision, biodiversity and as protection against extreme weather events. *Production forests* are reserved for plantations and planting of new forest. It is the predominant category of forests distributed to households, and allows farmers to harvest certain types and amounts of forest products, including logging of certain amounts of timber.

The reforms also evolved at different speed and along different trajectories in different parts of the country (Sowerwine 2004). The centrally developed policy reforms have largely also been transformed and re-interpreted in the interplay with local level socio-economic structures (Castella and Dang 2002, Sowerwine 2004, Clement and Amezaga 2009). Below we briefly introduce the provinces selected for this study’s review of policy effects on sub-national FT, namely the Lam Dong and the Bac Kan provinces.

3.2 Lam Dong Province

Lam Dong Province is a landlocked province, characterized by its upland environments. The population is 1,259,300 people (2014 census) and a population density of 129 per km². In 2013, the forest area was 532,100 hectares, or 54.5% of the land area. Large-scale in-migrations of people from the north of Vietnam have also shaped the recent history of the province. In addition, the government carried out schemes to resettle and convert the ethnic minority groups into sedentary agriculture, and to give up traditional shifting cultivation inside of the forest land. Due to the shorter history of communist rule (since 1975), Lam Dong was less affected by the years of collective policies, as compared to the northern provinces. Lam Dong has since the unification between the North and the South, also been considered as one of the high-potential provinces for logging. State control of forest land and large-scale logging carried out by the SFEs have been an important post-reunification policy. As a result, the SFEs and other government entities today control the major share of forest land, while households only have rights to about 1% of the forests (UN-REDD 2012).

3.3 Bac Kan Province

Bac Kan was established as a province in 1997. The population of Bac Kan was 308,900 people in 2014, with a population density of 65 per km². The total forest area was in 2013 370,000 ha, or 76.1% of the total land area. The province is divided between lowland valleys, well suited for paddy rice production, and upland, hilly forested areas.

Traditionally, the lowland areas have been inhabited by the ethnic *Tay*, while the uplands have been dominated by various ethnic minority groups. The groups have traditionally been practicing shifting agriculture inside of the forests. The collectivization policies introduced after independence in 1945 made these people move towards rice production and sedentary life styles, regardless of ethnic affiliations (Fatoux et al. 2002). Much of the forests was lost during the post-colonial period, and the province has since the early 1990s been part of the large-scale government reforestation programs. The SFEs have played a less important role in Bac Kan, and land reforms have implied the allocation of both agricultural and forest lands to individual households.

The two provinces selected as cases in this paper represent a ‘frontier’ (Lam Dong) and a ‘forest-agriculture mosaic’ (Baz Kan) zone (Table 1).

Table 1. Predicted drivers of forest cover change according to the different phases of forest transition, Lam Dong and Bac Kan provinces, Vietnam.

	Frontier areas (Lam Dong)	Forest-agriculture mosaics (Bac Kan)
Assumed drivers of forest loss/ -regrowth/ -conservation	<ul style="list-style-type: none"> - Land scarcity - High economic returns on land (land rent) - Scarcity of environmental services - Population growth - Market integration 	<ul style="list-style-type: none"> - Scarcity of forest products - Scarcity of environmental services - Economic development - Diminishing land rents - Urbanization

4 Data and methods

Information on forest cover change was mainly from government sources, that is, data collected by the Forest Inventory and Planning Institute (FIPI). Provincial data were publicly available for the 1999 to 2013 period (available at: www.kieclam.org.vn). Modified forest definitions from 2012 in Bac Kan substantially affected the comparability between years. In addition, the current borders of the Bac Kan Province are fairly recent, dating back to the end of the 1990s when Bac Thai province was split into the Thai Nguyen and Bac Kan provinces. We therefore focus on the 1999 – 2011 period. The FIPI data are collected by local forest rangers and officers, who report on forest areas burned, cleared and planted over the past year. The main weakness of the approach is that local authorities may have an incentive to “make things look good”, potentially biasing the data (Nguyen 2013). In FT terms, 12 years is a short period, but in combination with historic and narrative information about forest cover change, we can identify trends in forest cover change in the two provinces.

The processes driving deforestation and reforestation are only partly overlapping. We therefore calculated trends in deforestation by looking at the area of natural forest only. Similarly, change in plantation area gives an indication of structural forces and success of policies to plant trees. Net reforestation is the sum of changes in the areas of natural and plantation forests.

We report forest cover change as the percentage change of the total forest cover (FC) over the given time period between 1999 and 2011 by applying a formula for the compound annual rate of forest cover change (RFCC):

$$RFCC = ((FC_{1999}/FC_{2011})^{1/12} - 1) * 100$$

We also used official statistics to review trends in terms of demography (population trends and urbanization), economic growth (provincial levels of GDP), and agriculture and forestry developments (value wood products). The General Statistics Office of Vietnam (GSO) was the main source of information here (available at: https://www.gso.gov.vn/Default_en.aspx?tabid=491). In addition, we systematically reviewed literature analyzing policy effects within the specific provinces. In total, more than 30 publications regarding agricultural and forest sector development in the two provinces were reviewed (Table 2).

Table 2. Overview of reviewed provincial topic-specific literature and data sources.

Theme	Lam Dong	Bac Kan
Forest developments	<i>Data:</i> www.kiemplam.org.vn ; <i>Studies:</i> De Koninck (1999); Meyfroidt and Lambin (2009), Meyfroidt, Vu, and Hoang (2013)	<i>Data:</i> www.kiemplam.org.vn ; <i>Studies:</i> Castella and Verburg (2007); Nikolic et al. (2008)
Tenure and land use planning	<i>Studies:</i> McElwee (2012); SNV (2010); Salemink (2003)	<i>Studies:</i> Castella and Dang (2002); Castella et al. (2006); Tachibana, Nguyen, and Otsuka (2001)
Agriculture and forest policies	<i>Studies:</i> Déry (2000); D'haeze et al. (2005); Agergaard, Fold, and Gough (2009); SNV (2010); Tran (2010); Hoang et al. (2011); To et al. (2012); McElwee (2012); Enright (2012); Ogonowski and Enright (2013); Meyfroidt, Vu, and Hoang (2013); Vu Tien Dien and Grais (2013); Trædal, Vedeld, and Pétursson (2016)	<i>Studies:</i> Pandey and van Minh (1998); Minot and Goletti (2000); Tachibana, Nguyen, and Otsuka (2001); Zingerli et al. (2002); Sadoulet et al. (2002); Fatoux et al. (2002); Castella, Boissau, et al. (2005); Bernard et al. (2013)
General development	<i>Data:</i> GSO (<i>Living Standard Study</i>) (2012); PCI (2014) <i>Studies:</i> Salemink (2003)	<i>Data:</i> GSO (<i>Living Standard Study</i>) (2012); PCI (2014) <i>Studies:</i> Castella, Manh, et al. (2005); Castella et al. (2002); Castella, Tronche, and Vu (2002)

5 Results and discussion

In this section, we first compare forest cover changes in the two provinces, before discussing the three sets of factors that can explain these changes: general development trends and structural changes, general policies that might be relevant for forest dynamics, and finally specific sectoral (forest and agricultural) policies. Throughout, we seek to explore to what extent these changes fit into both the FT forest cover predictions and policy approaches.

5.1 Forest cover trends

Comparing the forest cover trends over the 1999-2011 period, confirms the assumed positive and negative trends in Bac Kan and Lam Dong, respectively. Even though plantations contributed to the lion's share of forest cover increase (59,078 ha), the area of natural forest in Bac Kan also increased (2,622 ha, or 0.10 % per year). This may indicate that a turnaround in the FT has taken place, regardless of the government plantation efforts. For Lam Dong, the data confirms the presumed negative trend in forest cover (-0.28% per year). The figures for natural forest loss is even more dramatic; over the 1999 – 2011 period, Lam Dong lost 58,811 ha or about 0.87% per year. At the same time, the area of plantations increased by 38,567 ha, making the net forest cover loss slightly above 20,000 ha. Forest plantation policies seem hence to have played a role and contributed to weakening the negative trend in 'frontier' Lam Dong.

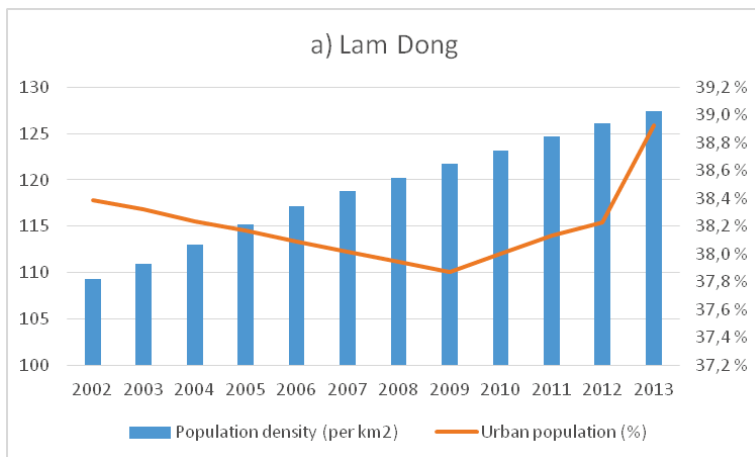
Table 3. Forest cover change in Bac Kan and Lam Dong provinces, Vietnam, 1999-2011.

	Bac Kan (<i>mosaic</i>)			Lam Dong (<i>frontier</i>)		
	1999	2011	%	1999	2011	%
Total forest cover (ha)	235247	296947	1.96 %	618537	598192	-0.28 %
Natural forest (ha)	224114	226736	0.10 %	591210	532399	-0.87 %
Plantations (ha)	11133	70211	16.59 %	27327	65794	7.60 %

Source: Forest Inventory and Planning Institute (FIPI 2013).

5.2 Structural changes

Demographic developments: Population densities have been increasing in both provinces, but the level is substantially higher in Lam Dong than in Bac Kan (Fig. 3 a) and b)). The share of the population living in urban areas is also higher in Lam Dong. This is contrary to standard FT assumptions, namely that in ‘frontier’ contexts, population densities and the degree of urbanization are lower than in the ‘mosaic’. In Asia, the average population densities are 80 persons/km² in ‘frontier’ as compared to 142 in ‘mosaic’ zones (Chomitz et al. 2007 in Angelsen and Rudel 2013). Lam Dong (‘frontier’) had a population density in 2013 of 127 persons per km² as compared to 63 in Bac Kan (‘mosaic’). Demographic changes in Lam Dong have largely been migration-driven, both through forced resettlements and voluntary migrations. Between 1976 and 1980, 450,000 people were resettled to the Central Highlands, and 260,000 people in the 1981-1988 period (Müller 2003). Migration policies and agricultural colonization have been in an important strategy in the modern Vietnamese state’s project of consolidating its control over peripheral territories, such as in the Central Highlands (Déry 2000).



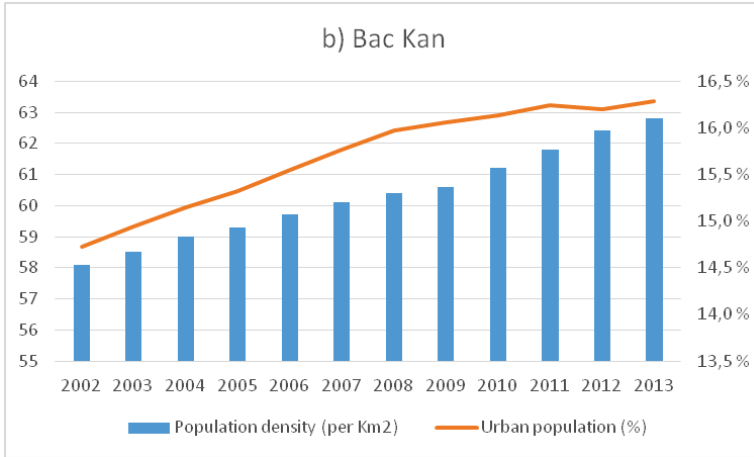


Figure 3. Demographic trends 2002-2013 in a) Lam Dong and b) Bac Kan Provinces, Vietnam, 2002-2013. Source: General Statistics Office of Vietnam (2016).

Economic development: FT theory also predicts positive correlations between economic development and FT; higher income and diversification of the economy takes pressure off forests and make the forest cover eventually increase. We used the National Living Standard Survey data to compare monthly income per capita at current prices in the 2002-2012 period in the two provinces (GSO 2012). In Lam Dong, monthly income per capita increased from USD 13 in 2002 to USD 88 in 2012, and inflation-adjusted this equals an annual growth of about 8.6%. In Bac Kan, GDP per capita also increased from about USD 9 in 2002 to USD 55 in 2012, equaling 7.8% growth per year (GSO 2012).

The income levels are thus significantly higher in Lam Dong than in Bac Kan, while the recent economic growth rates are comparable. Bac Kan is one of the poorest provinces in the country (Hoang et al. 2013), and households rely heavily on subsistence agriculture, which is linked to the low degree of urbanization. In contrast, Lam Dong is known as one of the emerging economic provinces, linked to commercial perennial crops such as coffee, tea and rubber. In terms of industrial development, the trends have been more positive in Lam Dong than in Bac Kan, where industrial production has been decreasing over the past years (GSO 2016).

Governance: There are limited governance data available at the provincial level. An exception is the provincial competitive index (PCI), developed and published by the business community in

Vietnam. The PCI is a composite, based on factors such as entry costs, tenure security, transparency, informal charges, policy biases, and provincial leadership. The PCI ranks the provinces according to their economic governance quality. Lam Dong ('frontier') scored substantially higher than Bac Kan ('mosaic') in 2014. Lam Dong was ranked 29 (*mid-high*), while Bac Kan was ranked 59 (*very low*) out of 63 provinces (PCI 2014).

5.3 General policies

Market reforms: The most prominent shift over the past few decades has been from central planning to a market oriented economy through the *doi moi* reforms. In rural areas, the effects were most pronounced within the agricultural sector in both provinces, related to the individualization of production and redistribution of land rights. The liberalization of agricultural prices, and production for both domestic and national markets, had huge impacts on rural economies. In the Central Highlands, the promotion of commercial coffee production in combination with favorable market trends, resulted in large immigration and extensive expansion of coffee areas (D'haeze et al. 2005). The trend in coffee area in Lam Dong indicates a clear link to the global coffee market prices (Fig. 4). Nevertheless, studies, such as Agergaard, Fold, and Gough (2009), have demonstrated that frontier settlements and adaptations have followed more complex trajectories than a simple market governed 'boom and bust' model. Spatial and temporal variations are highly governed by institutional and local settings, access to infrastructure, and the organizational setup of local coffee marketing chains. In addition, ethnic majority Kinh demonstrated higher abilities to respond and diversify livelihoods and adapt to collapses in coffee prices than the smaller and ethnic minority households, who were more prone to neglect coffee trees in times of coffee price collapses (Ha and Shively 2008).

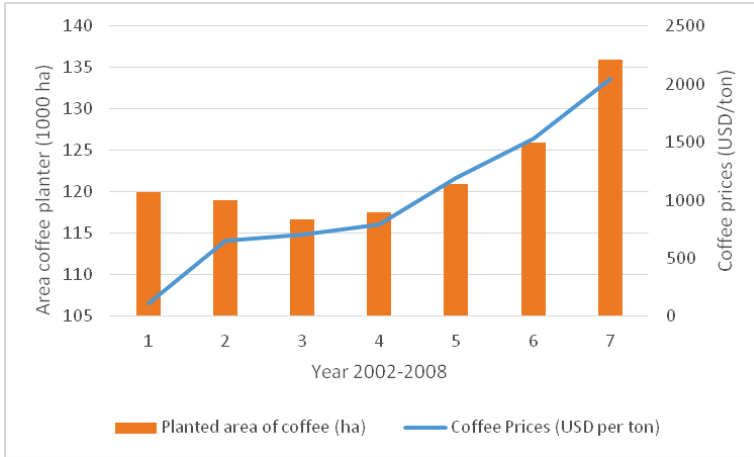


Figure 4. Changes in export prices and area of coffee production in Lam Dong Province, Vietnam. Source: Lam Dong Statistical Year Book 2008, in Tan (2011).

During the years of collective production, rice was widely promoted among rural households. In addition, the ethnic minority groups, traditionally practicing shifting agriculture on the hillsides, were forced into the collective rice production system. This period was characterized by sub-optimal agricultural production, food shortage, and illegal expansion of upland rice cultivation into forests. With *doi moi*, rice productivity took off, and continued increasing during the 1990s and early 2000s. Yields in Bac Kan increased from around 1.3 tons per ha in 1995 to 2.1 tons per ha in 2013 (GSO 2016). The individualization of both agricultural and forest land rights also discouraged migration and expansion of agriculture into new lands, lowering the pressure on forest lands (Sadoulet et al. 2002).

Infrastructure: Data on infrastructure development and road construction at provincial levels in Vietnam are sparse. At the national level, the total length of roads doubled during the 1990-2008 period. Strategic roads through the Central Highlands and Lam Dong (including one through the Da Nhim Forest) made new areas accessible for commercial perennial crops, mostly coffee (WB 2009). A study on the impact of this road expansion by Nguyen (2013) suggests a twofold forest effect: roads improve forest access and lower costs of clearing of land, but also increases access to markets and more diversified income opportunities which can relieve pressure on forests. Lack of infrastructure could also limit intensification and industrialization (Alther et al. 2002, Castella,

Manh, et al. 2005). In Bac Kan, infrastructure development seems to have been a precondition for the outreach of the reforestation programs, while isolation has facilitated the continuation of cultivation on forest land. In this way, the infrastructure development could have facilitated the FT turnaround here.

Tenure and decentralization: Forest tenure and land use reforms have affected the provinces differently, and forest classifications and forest land right structures are quite distinct in the two provinces. While about 80% of forest lands in Lam Dong are controlled by state entities (either State Forest Enterprises or Provincial Governments), individual households manage about 58% of the forest land in Bac Kan (UN-REDD 2012). In Lam Dong, less than 1% of the forest rights rest with individual households.

In Bac Kan, the changes in land use practices and the FT turnaround can largely be attributed to the land reforms of the late 1980s and early 1990s. The new land entitlements led to households' sedentarization, and to forest regrowth of land previously under shifting agriculture. The individualization of production and allocation of paddy land rights to households also led to more intensive land use, boosting input use and yield, and leading to the abandonment of more marginal lands (Fatoux et al. 2002). Tachibana, Nguyen, and Otsuka (2001) found that new land rights in Bac Kan resulted in a shift in resource use and investments, from new clearings to already cleared fields. Forest land allocations also reduced the need to clear new lands in order to claim rights (Castella et al. 2006).

At the same time, population growth and marginalization of minorities from the paddy lands have also implied continued cultivation of certain forest lands. After the decollectivization, the Tay reclaimed much of their ancestral lands that were confiscated during the collective period (Sadoulet et al. 2002). This left the other ethnic groups with only the allocated forest lands for productive purposes. As a response, agroforestry systems developed in which households cultivated perennials and crops, often in a type of rotational system (Fatoux et al. 2002).

In Lam Dong, forest land has to a very limited extent been distributed to individual households, reflecting the high-value forest resources and productive soils to which state entities want to maintain their rights. The SFEs have traditionally also had a strong position in the province. Unclear boundaries between forest and non-forest lands, and between the three forest categories,

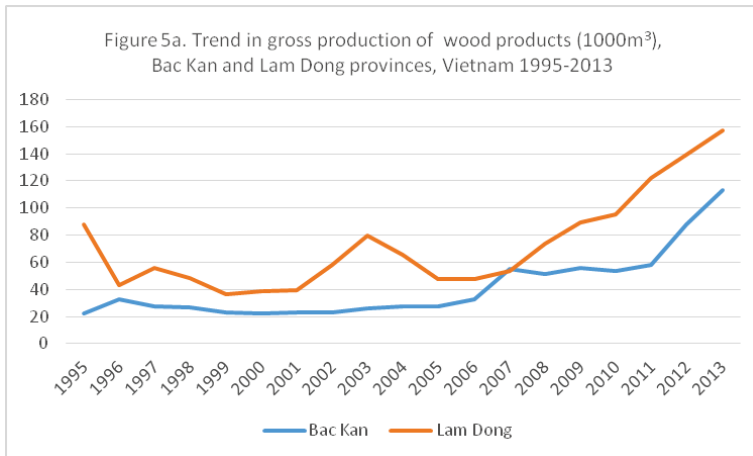
have also contributed to unsustainable practices (Vu Tien Dien and Grais 2013). The confusion have permitted powerful actors, such as rubber companies, to convert degraded forest lands into plantations (Tan 2011). In addition, unclear tenure has also been an incentive for households to clear new land to claim rights (SNV 2010). The tenure ambiguities have thus been a key point for discussion in the implementation of the Lam Dong PES pilot scheme (Trædal, Vedeld, and Pétursson 2016). Some claim that the prospects for PES revenues have provided incentives to cement current structures in order for the land owners to secure future income from existing and expected environmental payment schemes (McElwee 2012).

Agricultural policies and measures: Commercial coffee production is a main crop and livelihood option in Lam Dong. Higher coffee yields on existing lands in combination with intercropping of subsistence crops, has been a key element of the provincial REDD+ strategy. This has been done to reduce pressure on marginal lands (DARD 2014). Such a strategy is, however, far from being a guarantee for success, unless it is combined with restrictions on expansion of agriculture into forest land. Higher productivity of the commercial crops might just stimulate further expansion. This is particularly risky for price-inelastic crops, e.g., products sold at a global market, where the price-dampening effect of higher output is small (Angelsen and Kaimowitz 2001).

In Bac Kan, policies to intensify rice production, in combination with individualization of production and land rights, seem to have reduced pressure on marginal forest lands (Castella and Dang 2002). Yield enhancing policies have included support to multi-cropping varieties of (spring) rice, improved irrigation systems, fertilizers and pesticides (Fatoux et al. 2002). This agricultural transition started already during the collectivization period, yet many farmers preferred to cultivate illegally in the forest hillsides. This in turn caused a situation of *de facto* open-access and extensive losses of forests. The rice intensification only took off after the socio-economic shift (*doi moi*) (Sadoulet et al. 2002). The downside of these policies was the dwindling of traditional highland production systems (Castella and Erout 2002). In addition, the sedentarization of households, individual land rights, combined with increased population pressures, have increased soil degradation and lowered profitability of shifting agriculture (Castella et al. 2006). Reduced fallow periods and less flexible land rights systems (more individual based) have caused upland rice cultivation to become less sustainable (Pandey and van Minh 1998).

5.4 Forest sector specific policies

Regulation of logging: The 1992 logging ban caused an abrupt drop in Vietnam's timber production. Yet, since the mid-1990s, the volume of forest products has been increasing in both provinces, which has also been a general trend nationally (Fig. 5a and b). The main actors in the forestry sector of Lam Dong are the SFEs, who are allocated annual timber quotas by the government (Vu Tien Dien and Grais 2013). In Lam Dong, the logging ban had contradictory effects, as it also resulted in higher timber prices, making illegal logging more attractive (Tan 2011). This illustrates the dual effects of forest scarcity; it may stimulate tree planting and other reforestation processes in some areas, but also lead to continued or higher forest exploration in others.





Forest plantations: Bac Kan has been among the areas where forest cover was dramatically reduced during in the post-colonial collective era (Sadoulet et al. 2002). Even though the official policies emphasized the potential poverty reduction effects of forest plantations, the commercial activities related to tree plantations have generated only limited income to farmers, especially the poorest segments (Sikor 2011). The tree planting policy was not primarily motivated by the long-term households benefits, rather it was pushed by powerful actors in the pulp-and-paper and plywood industry (Lang 2002, McElwee 2016). In this sense, the expansion of forest plantations in Bac Kan is in line with the forest scarcity hypothesis of the FT theory; booming demand for timber within a particular sector led to the evolvement of forest plantations policy in Bac Kan (and in many other provinces).

Forest protection: Forest protection measures have been introduced in both provinces through the establishment of national parks. Lam Dong has two nature reserves: Cat Tien National Park, established in the late 1970s, and Bi Doup Nui Baa, established in 2004. Bac Kan has one national park, Ba Be National Park (1992). The areas of special use forests (strict protection) constitute about 13.4% of the forest area (78,525 ha) in Lam Dong and 6.6% (25,581 ha) in Bac Kan.

Comparing forest cover trends, studies do *not* show significant differences in deforestation and degradation between the national parks in Lam Dong and the surrounding areas (SNV 2010). The experiences from Ba Be National Park are similar; the only documented effect was the ‘passive protection’ in the form of rugged limestone mountains in the core areas of the park, rather than the

protection status itself (Zingerli et al. 2002). The area of dense forests in the buffer zones and surroundings of Ba Be has decreased at the same rate as in the rest of the province.

PES and REDD+: A number of environmental schemes has been tested and implemented in different parts of the country. Lam Dong has since 2008 been a pilot province for PES and since 2009 for REDD+. Even though narrative information indicates that the number of violations has declined in the PES implementation zones of Lam Dong (e.g. Tran 2010, McElwee 2016), the forest impacts of the PES scheme are uncertain. The opportunity costs of most livelihood activities are well above the current PES level (of VND 300,000 per hectare). Unclear tenure and land rights have also been an issue in relation to the distribution of PES. Since 2010, the PES scheme has been scaled up to national level. Even though land tenure and land rights are more developed in Bac Kan, the PES scheme has so far not been widely implemented there.

PES has so far in Vietnam not been performance based, which one might argue is a contradiction of terms. Ogonowski and Enright (2013) estimated that with prices of USD 5 (VND 105,000) per tCO₂, PES would be competitive with most current land uses in Lam Dong, such as rice and coffee production. PES would, however, face tougher challenges in competing with booming industrial crops such as rubber (Meyfroidt, Vu, and Hoang 2013). In order to succeed, PES will have to develop place-based approaches based on local conditions of land uses and opportunity costs.

	Forest rent and capture		Agriculture rent		Direct regulation	
	<i>Bac Kan</i>	<i>Lam Dong</i>	<i>Bac Kan</i>	<i>Lam Dong</i>	<i>Bac Kan</i>	<i>Lam Dong</i>
Structural changes (population growth, urbanization, market processes, etc.)	Primary production the main sector. Wood production linked to growth of pulp and paper industry.	Forest resources highly regulated by government. GDP and population growth assumed not to affect forest rent and capture. Slight increase in wood production linked to quotas released to SFEs.	Population growth causing lack of land. More intensive land use. Ethnic factor important for production patterns. Population increase leading to shifting agriculture becoming less sustainable.	Population growth and immigration causing lack of land. Illegal expansion of perennial crops into forest land. Ethnic factor important. Traditional shifting agriculture. Still, some areas included in commercial coffee production.		
General policies	<i>Doi moi.</i> Market economy. Individual forest land rights, causing increased investments on forest land	<i>Doi moi.</i> Market economy. Migration policies causing increased populations and pressure on land.	<i>Doi moi.</i> Refocus on lowland paddy production and individual production. Less	<i>Doi moi.</i> New Economic Zone. Perennial crops for global market, such as rubber,	Decentralization, including devolution of land rights (forest and agriculture) and administrative.	Decentralization, including agricultural land rights and administrative responsibilities.

<p>(both plantations and perennial crops).</p>	<p>extensive use, less expansion. Partly due to forest land rights. Two-child policies less strictly implemented in rural areas.</p>	<p>coffee and tea. Higher land rents, leading to immigration and population growth. Two-child policies less strictly implemented in rural areas.</p>	<p>Less expansion in and around Ba Be National Park. Ban on shifting agriculture.</p>	<p>Establishment of national parks. Ban on logging. Reduced state-led logging (but increased illegal activities)</p>
<p>Specific policies (PES, tree planting subsidies, etc.)</p>	<p>Tree planting. Farmers subsidized with seedlings and funds.</p>	<p>Forest patrolling and PES policies. Reduced violations? But undocumented results. Opportunity costs outperform payments. Future carbon market able to outperform? USD 5 tons carbon outperform opportunity costs of coffee.</p>	<p>Government support to coffee production. Migration to develop the NEZ. Perennials important crops. Land limiting factor due to strict government land use zoning. Illegal expansion widespread.</p>	<p>Government support to coffee production. Migration to develop the NEZ. Perennials important crops. Land limiting factor due to strict government land use zoning. Illegal expansion widespread.</p>

Table 4. Post-*doi moi* (1986 onwards) policies relevant for FT and forest dynamics in Lam Dong and Bac Kan Provinces, Vietnam

6 Concluding remarks

At the national level, Vietnam seems to fit nicely within the predicted FT pattern: total forest cover has started to increase after decades of net forest loss. Such national trends conceal contrasting developments at sub-national scales. First, the local biophysical settings differ, e.g., forest cover, soil, topography and accessibility. Second, local economic structure and institutions differ, e.g., the tenure regime. Third, the FT transition embodies drivers that may have contradictory effects depending on the other factors, as best exemplified by forest conserving and forest destroying potential of agricultural intensification. Fourth, policies interact with these factors and co-determine the forest outcomes. Moreover, many policies have – as documented in this paper – been place-specific, strongly influencing the regional forest cover trajectories. In sum, even though patterns of sub-national FT can also be discerned, they are driven by context specific factors and policies that cannot easily be summarized into the standard FT pathways (Table 4).

In relation to the growing literature on drivers and policies in relation to the forest transition, we highlight three lessons from the current study. First, the income level is not in itself a reliable predictor of the stage in the forest transition. The Bac Kan province is further along the FT, in spite of being significantly poorer than Lam Dong. The FT is easily attributed to general development trends in terms of GDP and population growth and urbanization. It is one of the poorest provinces in Vietnam, and population densities and the degree of urbanization are still low. Subsistence (rice) production is still the dominant sector. Policies of failed collective policies caused more extensive and marginal production (shifting cultivation) to be perceived as more profitable for individual households, causing large-scale expansion and forest cover loss during the planned economy period. Land reforms and individualization of (agricultural) land from the mid-1980s, further reinforced by new and more intensified modes of production, depressed the profitability (land rent) of agricultural production on marginal forest lands. This, in combination with tree plantations, contributed to a FT in Bac Kan.

In contrast, the richer Lam Dong province seems much more like a classical ‘frontier’ area that fits the story from other countries well. The expansion of perennial commercial crops and a booming population because of large-scale, state sponsored immigration have been key drivers behind the forest loss. Several studies have also found clear linkages between global coffee prices and area expansion, confirming high agricultural rent can be a potent driver of forest cover loss.

Second, the role of different economic actors may also need to be revisited. FT in Asia has been perceived to be smallholder-driven, as outlined in the last paper by Mather (2007), the father of the FT. In the Vietnam context, however, reforestation efforts cannot solely be viewed from a small-scale producers' perspective; it is also as a result of a push from - and lobbying by - the domestic pulp and paper, plywood and wood chip industries (Lang 2002, McElwee 2016).

Third, the mixed forest policies are noteworthy. Despite that the frontier province (Lam Dong) has been more conservation oriented than the mosaic one (Bac Kan), these policies seem largely to have backfired as compared to what the intentions were. The ban on logging and stricter policies increased scarcity of forest products, leading to higher timber prices and more illegal logging (Tan 2011). In Lam Dong, the tensions between conservation and agricultural development are also pronounced; agricultural targets and objectives of political control and development seem to have undermined those of forest conservation and providing forest-based environmental services. The policies identified in the FT policy approach seem relevant on a general level, but must be accompanied and guided by context specific knowledge about the direct and underlying drivers of change, and about the opportunity costs of predominating activities.

In short, the Vietnam forest cover story is about the decisive role of policies, and how that – in combination with local specific context – modify or even overturn the many of the general FT predictions. In practical policy-making, studying sub-national FT processes may provide more fruitful inputs than 'conventional' national level approaches. Further, the policies affecting forest cover have been embedded in policy processes that relate to more general policy targets of societal change, in particular economic development through *doi moi* policies in the form of market liberalization, individualization of land rights, and large-scale commercial agricultural shift. While this, at least in the case of Lam Dong, may serve to illustrate development-environment trade-offs, it also illustrates that the FT is not a natural law, and can be greatly influenced by – intentional and non-intentional - policies.

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Paper 3

Article (under review in Forest¹)

Livelihoods and land uses in environmental policy approaches: The case of PES and REDD+ in the Lam Dong Province of Vietnam

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Abstract: This paper explores assumptions about the drivers of forest cover change in a PES and REDD+ context in the Lam Dong Province in Vietnam. In policy discourses, deforestation is often linked to ‘poor’ and ‘ethnic minority’ households and their unsustainable practices such as the expansion of coffee production (and other agricultural activities) into forest areas. The paper applies a livelihood framework to discuss the links between livelihoods and land use amongst small-scale farmers in two communities. The findings of the livelihood survey demonstrate no clear linkages between poverty levels and unsustainable practices. The ways in which current PES and REDD+ approaches are designed do not provide appropriate solutions to address the underlying dimensions of issues at stake. The paper criticizes one-dimensional perspectives of the drivers behind deforestation and forest degradation often found in public policies and discourses. We suggest more comprehensive analyses of underlying factors encompassing the entire coffee production and land use system in this region. Addressing issues of land tenure and the scarcity of productive lands, and generating viable off-farm income alternatives seem to be crucial. Sustainable approaches for reducing deforestation and degradation could be possible through engaging with multiple stakeholders, including the business-oriented households in control of the coffee trade and of land transactions.

Key words: Vietnam, drivers of deforestation, livelihoods, environmental policies, REDD+, PES

1. Introduction

Tropical deforestation has been identified as one of the main global environmental challenges, contributing to a major share of the global emissions of greenhouse gasses and to the loss of biodiversity and ecological integrity worldwide [1]. At the same time, tropical forests are key arenas for livelihoods and outcomes for indigenous people and forest communities. Over recent years, the process of establishing a global mechanism for Reduced Emissions from Deforestation and Degradation (REDD+) has increased the focus on saving tropical forests. This

¹ The layout, format and style of referencing are adapted to the requirements of the journal.

has prompted a number of tropical forest countries to develop policies and prepare for reducing greenhouse gas (GHG) emissions from forests. However, the lack of progress in global climate change negotiations and in establishing a global REDD+ mechanism has stalled the process and also led to a diversity of approaches and adaptations of REDD+ in many countries [2].

In this paper, we use a case study from Vietnam to explore assumed and real processes driving forest cover change, and scrutinize some of the approaches taken for REDD+. In the Central Highlands of Vietnam, small-scale coffee production has been identified as a major driver of forest cover loss, and it is frequently associated with other negative environmental and social consequences, such as soil erosion, and economic and political marginalization of ethnic minority groups [3-5]. Various policy schemes to decrease environmental degradation and reduce poverty levels have been developed and implemented. Recently, innovative, results-based policy initiatives such as Payments for Environmental Services (PES) and REDD+ have been introduced to attempt to alleviate some of the problems. A predominant argument in forest-related policy discourses is that poverty and general low knowledge levels among ethnic groups often lead to sub-optimal and unsustainable livelihood decision making [6]. The poverty-deforestation link is not unique to Vietnam, but can be identified in readiness processes of various REDD+ countries, as documented by e.g. Dooley et al. in their review of Readiness Preparedness Proposals (R-PP) submitted to the World Bank Forest Carbon Partnership Facility (FCPF) [7].

In Vietnam, dealing with the (perceived) negative linkages between poverty levels and environmental degradation has frequently been associated with the need for awareness raising and reducing poverty rates among indigenous groups [4]. Such aims are explicitly expressed in national forest-related policy documents and discourses, such as the Lam Dong Province Provincial REDD+ Action Plan [8, p. 8]:

'Ethnic minority people in particular, have been carrying out deforestation and converting forest land to settlements and agricultural land to support their traditionally very large families. Awareness raising amongst both male and female members of the community is needed to reduce population growth and the deforestation associated with it.'

This paper uses an empirical case study of the interrelationships between livelihoods and land use to investigate policy assumptions about the drivers of land use change. In Vietnam, the coffee sector, and poor people in particular, are often blamed for deforestation processes, and this sector and group of households are therefore frequently targets of environmental programs, such as PES and REDD+. The study demonstrates the shortcomings of one-dimensional analyses of drivers of land use change in policies that aim to reduce deforestation and degradation. We argue that poor people do not deforest the most, and that targeting the coffee sector will be a challenging task unless the reforms are embedded in wider structures of the coffee industry. The focus on linking the direct drivers of change to small-scale coffee production by poor households seems to mask many of the underlying factors, such as longer-term 'control' and vested interests of state-owned coffee companies and the more wealthy segments of the population in maintaining a particular mode of production. Therefore, REDD+ projects are likely to fail in achieving their goals of reducing deforestation and degradation if they are targeted only at the poor, and omit the structural determinants of the coffee sector at large.

PES has been introduced in the area to cope with smallholder expansion of coffee. Based on the findings, we reflect upon the magnitude and scale of forest conversion caused by the expansion of small-scale livelihood-driven coffee production. We also investigate the social and

environmental impacts of the local PES scheme. PES is also likely to become a key component of REDD+ in Lam Dong, and the paper therefore discusses the implications of the findings in terms of practical policy implementation, particularly in view of the ongoing and planned REDD+ pilot activities in the area.

More concretely, the paper explores the following research questions: (1) How do households manage and diversify assets and resources to generate livelihood outcomes? (2) What are the impacts of PES policies on livelihoods, environmental awareness and deforestation? (3) How do the overall production structures of the coffee economy affect livelihoods and deforestation processes? (4) What are the potential implications for emerging REDD+ policies?

The paper starts by outlining the conceptual models considered relevant for the study. This is followed-up by an introduction of the methodology and case study context. Considering the high degree of market integration and the presence of various policy schemes, analyzing the overall context and dynamics of the coffee sector and policy schemes is crucial for understanding livelihoods and land use in the study area. The final section discusses the results in view of livelihood outcomes and policy implications for REDD+ and PES schemes.

2. Conceptual framework

The paper investigates households' livelihoods and the implications for land use and deforestation in the study area. These findings are further used to analyze policy assumptions about 'poor' and 'ethnic' households and their alleged unsustainable land-use practices that tend to be prevalent in policy documents and other discourses. Perspectives from livelihood theory, political ecology and land-use change theory consequently inspire the conceptual framework for the study.

We applied a livelihood framework (LF) to identify differences in livelihood adaptations, and the role of small-scale coffee production in local land-use changes and deforestation. According to the LF, households combine various capitals, such as natural, physical, human, social, and financial capitals, to generate livelihood outcomes in the form of agricultural and forestry outputs, and off-farm and business oriented income [9, 10]. Hence, the determinant relationship between the households' asset portfolios, livelihood strategies and outcomes is at the core of the LF. Institutional factors such as property regimes, markets, local values, attitudes and norms, skills, and various other social institutions and decisions taken at multiple scales, also affect access to assets and livelihood decision making in households [9, 11]. The clearing of forests and expansion of agricultural areas are important components in the livelihood strategies of households [12].

Defining the relevant drivers of deforestation and degradation has been identified as one of the main challenges in developing efficient and effective REDD+ strategies and policies, and is a field that requires further research [13, 14]. The land-use change literature frequently differentiates between *proximate* (direct) and *underlying* (indirect) causes of environmental change [15, 16, 17]. In our case study area, smallholder coffee production could be viewed as a main *proximate* driver of deforestation. In policy discourses, this has often been linked to livelihood needs and poverty as *underlying* drivers [8].

The dynamics of the drivers of deforestation have changed over time and space in different parts of the world. In a meta-analysis place and time-specific case studies, Rudel et al. detected a general trend from small farmers as a main agent of deforestation in the pre-1990 period, towards more agrobusiness related activities in the after 1990 [18]. In Vietnam the deforestation trends have often been associated with large-scale deforestation processes of so-called 'slash-and-burn'

and state-led deforestation in the post-colonial period up till the late 1980s, towards more smallholder-oriented expansions of commercial agriculture in certain areas of the country in the 1990s and 2000s [19].

Nevertheless, making wide generalizations about the drivers of environmental degradation often masks the complexities of such processes. Tim Forsyth has termed widely accepted assumptions of the drivers of environmental change as ‘environmental orthodoxies’ [20, p. 52]. Such orthodoxies have been predominant in Vietnam, frequently obscuring many other underlying factors of change [21]. Notions about ethnic people’s unsustainable practices in Vietnam were formerly linked to ‘slash-and-burn’ agriculture. Nevertheless, such perceptions are also found in relation to the expansion of smallholder coffee production, as demonstrated by the quotation from the Lam Dong REDD+ Action Plan above. In this sense, the way REDD+ has been conceived in Vietnam risks ignoring important dimensions and actors involved, particularly in the coffee sector and related land-use change processes.

3. Methodology

In order to respond to the research objectives and questions presented above, the study adopted a case study approach. The data collection instruments included a household survey and in-depth interviews with farmers, policy makers, researchers and government officials at national, provincial and commune levels. The findings were triangulated against other socio-economic and qualitative studies carried out in the region, such as Hoang et al. [6], Tran [22], and Ogonowski and Enright [23]. The following sections describe the case study area and key approaches used in the collection and analyses of data.

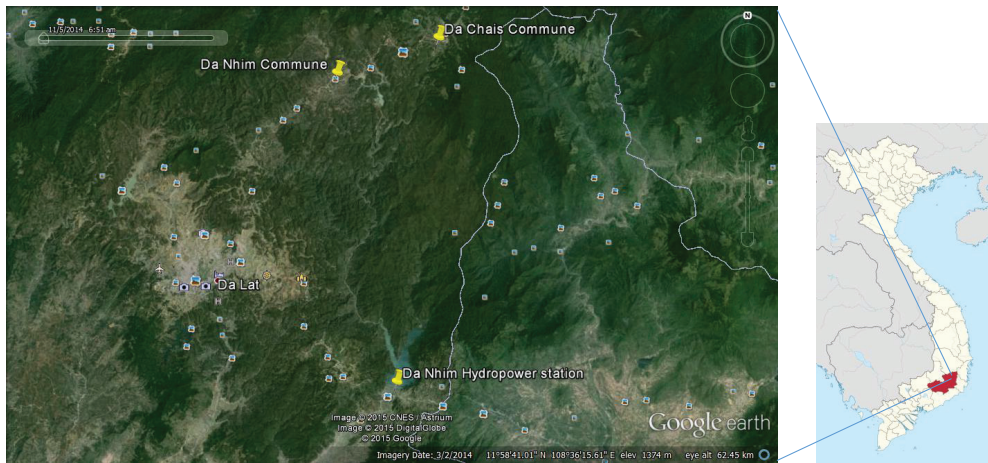
3.1 Case study area

The fieldwork was carried out in the Lam Dong Province (Fig. 1) which has a population of 1,259,300 (2014)², and covers an area of 9,764.8 km² [24]. The province is landlocked, and characterized by upland environments. The average elevation is approximately 1,500 meters above sea level. Precipitation is irregular in space and time, ranging from 1,600 to about 2,700 mm [24]. The variations in landscapes and precipitation contribute to exceptional bio- and ecological diversity [25].

Historically, the economy of the province has been based on agriculture. General development trends need to be understood in the light of large-scale immigrations of people in the 1970s and 80s, both as a result of government policies to inhabit, develop and control the Central Highlands [26], and of people from the region seeking refuge from war and unrest. More recent immigrations have taken place through people seeking new economic opportunities, mainly related to commercial agriculture, such as the production of perennial crops (mainly coffee, rubber and tea), vegetables and flowers. Another factor was the resettlement of various ethnic minority groups that had traditionally practiced shifting agriculture within the region. These were situated in residential areas during the government’s large-scale ‘fixed agriculture’ schemes of the 1970s and 80s [21]. The combination of displacement of people, voluntary migrations, and government land confiscations, caused losses of rights to ancestral lands for various ethnic groups, and increased conflict levels over access to land and natural resources [27]. In the Lam Dong Province, land-use change and deforestation have been closely associated with the marginalization of ethnic minorities, land confiscations, forced resettlement, migrations of people, and last but not least, the

² Source: Vietnam General Statistics Office (https://www.gso.gov.vn/default_en.aspx?tabid=774), accessed 02.03.2016.

integration of agriculture and local communities into a market economy [25]. Recent studies have also revealed trends of displacement of shifting cultivation for annual crops into forest margins, indirectly driven by the expansion of perennial commercial crops (mainly coffee) on agricultural land, a direct manifestation of the marginalization of ethnic groups in the Central Highlands [5].



Sources: Maps generated from Google Earth and Wikipedia³.

Figure 1. Study sites of Da Nhim and Da Chais, Lam Dong Province, Vietnam, 2016

Historically, coffee was not an important agricultural crop in Vietnam. It was initially introduced by the French colonialists as a plantation crop but during history, small-scale farmers have also widely adopted it as a cash crop [28]. During the late 1980s and 1990s, coffee production exploded, and during a decade or so, Vietnam became the world's second biggest coffee producer [29]. Key reasons for this dramatic development related to a large extent to the economic and agricultural transformation processes of the market liberalization processes (often referred to as the *doi moi*) that started in the mid-1980s [30]. The shift also related to conscious government policies of improved credit facilities, research and development, general extension activities, tenure reforms, and foreign investment [31]. The government policies have been driven by a wish to commercialize and increase the number of (agricultural) export products in order to stimulate economic growth (Fig. 2). Today, coffee is grown in a variety of locations and types of farmers, ranging from small-scale household producers to larger plantations [29]. The commercial coffee production has also spurred the emergence of private businesses locally, linked mainly to coffee trading, fertilizer provision, resale and general trade in farm supplies [32]. The great influx of people to the Central Highlands to grow coffee have, however, caused tensions and conflicts over productive land between majority *Kinh* people and various ethnic minorities.

The Vietnamese state has also played a very active role in the promotion of the coffee sector in the country, and continues to have an interest in its development and continued growth.

³ http://en.wikipedia.org/wiki/L%C3%A2m_Dong_Province#/media/File:Lam_Dong_in_Vietnam.svg

In 1995, the National Coffee Corporation (VINACAFE) was established by the government under the auspices of the Ministry of Agriculture to organize trade and develop the coffee sector in the country [33]. Its mandate has been very diverse, ranging from implementing government policies, research, extension services, quality control, and a major commercial actor controlling a major share of the coffee export [28, 34].



Figure 2. “Grow coffee to increase the number of products for exportation” - propaganda poster for promoting coffee production in Vietnam.

In the late 1990s, a collapse in global coffee affected the sector negatively, including the coffee producing households and their livelihoods, demonstrating the potential vulnerability of basing livelihoods single-mindedly on producing for a global commodity market. In recent years, fluctuating global prices, high debt levels and bankruptcies amongst banks and key investors continue to negatively impact the sector, including the economy of VINACAFE [35]. Debt levels have reportedly also increased amongst rural households in coffee-producing zones, including the area in which this study was undertaken [6]. Studies have, however, revealed big differences between ethnic groups in terms of abilities to adapt and cope with price fluctuations, the *Kinh* demonstrating higher capacities to diversify livelihoods and income sources as compared to the minority groups [36].

The agricultural system related to coffee production in Lam Dong is characterized by the homeland production⁴ of coffee (in combination with persimmon and vegetables), and the *hillside* production of coffee, sometimes mixed with persimmon and maize for subsistence. The homeland areas are certified agricultural land, while the hillside coffee plots are farther away and are often the result of illegal clearing of forests. Today, coffee production is considered a major driver of land-use change, causing the loss and degradation of large forest areas [4, 5, 37]. By reviewing the production statistics of Lam Dong in the 2002-2011 period, Tan [3] demonstrates that the expansion of coffee production in Lam Dong do seem to correlate with a rise in the price of coffee.

In order to reduce environmental degradation and enhance social development in the rural areas, a number of forest policy reforms and plans have been designed and implemented since the early 1990s. These include the ‘327’ and the ‘661’ programs (the 661 program is also known as the 5 Million Hectares Reforestation Program). These programs had the twofold objectives of conserving the remaining forests and expanding tree cover on the ‘barren’ lands by means of large-scale replanting of trees [38]. In the Lam Dong area, the extent of forest plantations has increased from about 27,000 ha in 1999 to almost 66,000 ha in 2011 [39]. However, official data records show that in recent years in the overall region of the Central Highlands, the negative trend of deforestation has continued.

Following the Ministry of Agriculture’s forest land classification system, forests are classified as *special use*, *conservation* or *production* forests [38]. A key approach to reducing deforestation has been to establish national parks categorized as *special use* forests and large areas categorized as *protection* forests. The latter category has the purpose of conserving key environmental functions and services, such as water provision, energy production, soil protection, and protection against extreme weather events. *Production* forests are intended to be plantations that allow the production and sale of timber and non-timber forest products, in combination with environmental protection practices [40]. In Lam Dong, the relative proportion of *protection* and *special use* forests is quite high compared to *production* forests. There are two large national parks in Lam Dong (Cat Tien and Bidoup-Nui Ba), both of which are categorized as *special use* forests. The forest classification and tenure regimes provide guidelines for what types of activities are allowed on forest land, representing a rather strict system for controlling activities and resources. This, in turn, has important implications for access to land, land use and livelihood outcomes.

Forest tenure reforms and the distribution of forest land to individual households have been carried out in Vietnam to varying extents. In Lam Dong, state entities such as the State Forest Enterprises, Forest Management Boards and People’s Committees still control most forest land. Individual households manage only 1% of forest land. On the other hand, many households in the area have agricultural land certificates (*red books*) to their homeland areas [4].

3.1.1 PES in Lam Dong

Since 2008, Lam Dong has been a pilot province for the national PES program [41]. Even though the prospects for successful PES implementation were described as meagre [42], the Vietnam PES ‘experiment’ is today often regarded as a successful case, and frequently used as a showcase for other countries in the Mekong Region and Southeast Asia [see e.g. 43]. This is mainly due to its scale and ability to generate substantial amounts of funds.

⁴ ‘Homeland production’ here does not refer to home gardens, but rather to agricultural fields close to the house. These are normally areas of land that are denominated and certified for agricultural use.

The pilot scheme for PES was established in Lam Dong and Son La provinces already in 2008 [44], and in 2010 it was scaled up as a nation-wide policy [45]. The Vietnam Forest Sector Development Fund (VNFF) is responsible for channeling, managing and coordinating the PES funds. During the piloting phase in Lam Dong, 9,870 households were included in the scheme covering nearly 210,000 ha of forest [46].

The poverty reduction objectives of PES (and REDD+) are emphasized in various policy documents, and must be understood within the general objectives of the 2006-2020 Vietnam Forestry Development Strategy [47]. This strategy identifies poverty reduction and socio-economic development as key objectives of the forest sector. On the other hand, PES in Vietnam has been criticized for elite capture of financial resources and for failing to target the underlying causes of environmental degradation, such as contested land rights and the general lack of participation and involvement in resource management [48, 49].

The critique of PES also includes a general lack of clear linkages between payments and performance [4, 50]. In Lam Dong, the PES setup implies a *forest leaser model* in which households, either individually or collectively, are hired by the state forest owners to look after forest land. This work is organized in so-called 'forest protection groups' that are collectively responsible for monitoring and controlling forest land. In this sense, the contracts and duties resemble labor contracts more than anything else, and disbursements are based on participation, rather than performance. The performance component of PES was reportedly rejected in Lam Dong due to resistance and lack of understanding as to why some households might receive higher payments than others [50]. With the implementation of REDD+ however, it is planned that the performance component of forest protection will be reintroduced in Lam Dong [8].

3.1.2 REDD+ in Lam Dong

Vietnam was approved as a UN REDD Programme country in 2008, and was later granted a second phase of support. In addition, the country has received readiness support from the World Bank Forest Carbon Partnership Facility (FCPF). During the first phase of REDD+, activities were limited to testing approaches for participatory carbon monitoring, and free, prior and informed consent (FPIC). In UN REDD Phase II, five more provinces were added, all of which have developed provincial REDD+ action plans (PRAPs) that detail funding streams and more concrete activities to be tested for relieving pressure on – and increasing – forest areas in Lam Dong. In total, over the five years of implementation, the PRAP has a total budget of 1,749,275 million VND, equivalent of about 83.3 million USD [8].

In anticipation of a global results-based REDD+ mechanism, the REDD+ Action Plan for Lam Dong is meant to be a coordination mechanism for various potential funding sources that are relevant in reducing GHG emissions from forests, and increasing forest carbon stocks [8]. Potential funding sources include Official Development Assistance, PES, REDD+ projects and programs (for example, by NGOs), and state-funded budgets. REDD+ will largely build on the institutional structures that were developed through PES [51]. Support for forest protection will continue to be channeled through the VNFF and carried out through the same system of forest protection groups. The results-based component that was 'lost' in PES will be reintroduced through REDD+. At the outset, the results-based component was meant to be linked to an extensive participatory carbon monitoring component. This aspect has, however, over time been toned down, and replaced by a conventional remote sensing data approach along the UNFCCC guidelines. This also forms the basis for Vietnam's application for support through the FCPF Carbon Fund [52]. Here the emissions

reduction and removal potential for the six pilot provinces over the 2016-2020 period is estimated to be 20.66 MtCO₂, equivalent of more than 100 million USD taking a price of 5 USD per tCO₂ into account.

The PRAP identifies small-scale agriculture, in part linked to ethnic minorities' 'unsustainable practices', as a main driver of deforestation in the Lam Dong province. On the other hand national levels studies of the drivers of deforestation and degradation, tend to put more emphasis on the links between coffee expansion and the forces and elasticities of the global coffee commodity market [19]. The void between the national broad sweeping analyses of the drivers of change, and the provincial and local level approaches of livelihoods improvement and diversification is striking. The PRAP's REDD+ activities include components of training of farmers in agricultural techniques (with a focus on intensifying production in the form of more coffee per unit of land), and establishing village development funds to provide farmers with favorable loans in order to stimulate the establishment of alternative livelihoods [8]. In addition, it includes components of increasing the economic value of agriculture, cultivating multipurpose tree species that can contribute to diversifying income, planting more trees (forest rehabilitation) (similar to the 661 program approaches, except that tree species should be indigenous), and promoting livestock as a way of diversifying household economies. [8]. Nevertheless, how –and to what degree - REDD+ aims at targeting the underlying structures of the coffee sector at large remains unclear in current plans and approaches.

3.3 Study sample

For the survey, we selected the two communes Da Nhim and Da Chais in the Lac Duong District of Lam Dong, with 2009 populations of 3,347 and 1,339 respectively [22]. Four villages were randomly selected from within the communes, and 25 households interviewed in each village. This constituted a total sample of 100 households of the 915 households in the two communes. The ethnic composition of households is similar in the two communes (about 85% *K'ho*), and thus the *K'ho* constituted 85% of our total sample. The remaining households were *Kinh* (14%) and *Tay* (1%). With regard to socio-economic status and land use (in particular agricultural expansion), the Lac Duong District contains some of the more inaccessible areas in the province, as well as a high percentage of ethnic minorities [25]. In this sense, the communes are representative of the economically more marginal – but forest rich – areas of the province. In both of the communes, forest areas are predominantly of *protection* type. In addition, in Da Nhim there are certain areas taken out of the official forest classification system that are categorized as *unclassified forest* that potentially could be used for 'planned deforestation' activities (including for hydropower, mining, ecotourism and agriculture) [53].

The two communes were considered as representative of the PES household population in the province, as they form key areas for PES and REDD+ policy implementation within the Da Nhim watershed. In this context, the Da Nhim hydropower station is the customer, buying environmental 'services' (water for energy production) from the forest owners (the Da Nhim Forest Management Board (DNFMB) and the Bidoup-Nui Ba National Park (BNBNP)) for managing the upstream forests. The forest owners in turn contract households to conserve and manage forests sustainably in order to provide water to the hydropower station. Households are trained and paid to carry out community patrolling of the forests. The approach and implications for the households in terms of training, duties and remunerations are similar for the contractual arrangements with the DNFMB and the BNBNP. According to the information we received at the

commune and province levels, households are selected based on ethnicity (minorities are prioritized) and income (the poor are prioritized). Seventy-nine of the households in the sample participated in PES, constituting 18% of the 450 households targeted through PES schemes in the area [6].

The REDD+ pilot activities of the Lam Dong Provincial REDD+ Action Plan started in the area only after we had conducted our survey. Our reflections around REDD+ impacts and implications are therefore based on reviews of policy documents and in-depth interviews that we carried out before the REDD+ activities were implemented in the communes and after the survey.

3.4 Data analyses

3.4.1 Investigating livelihoods

We investigated livelihood assets, activities and different sources of income (including agriculture and various off-farm activities) from different households. This provided information about differences in land use. In order to further investigate the factors that determine income, we ran a multiple regression model of total income against various socio-economic assets [10]. We assumed that income is dependent on financial, physical, social, human and cultural capitals. Households were also categorized into three equal-sized income groups ('poor', 'medium' and 'better off') based on yearly income in order to investigate differences in livelihood income sources, priorities and decision making in relation to land use. Here we used pre-PES income levels (that is, total net income without PES) as the basis for the income categorization. This was done in order to capture the poverty dimensions predicted in policy documents regarding the manner in which households in the area were selected for PES.⁵ The mapping of livelihoods and land-use practices feeds into the study of impacts of PES and REDD+ policies in the area.

3.4.2 Measuring the drivers of changes in forest cover

Micro-studies of land use and decision making at household level tend to be site specific, and it is often challenging to extrapolate results in space and over time [16, 54]. However, we maintain that context-specific studies can introduce nuances in perceptions and orthodoxies about the drivers of land-use change that are widely accepted and often taken for granted, particularly in policies and measures that deal with environment and development issues.

In order to avoid potential biases of data, self-reporting on land use and land use change was consistently avoided in the survey. We did not ask people directly about whether they had cleared land or not. We calculated land-use changes on the respective households' land by combining in-field measures and observations. In total, 181 agricultural plots were walked and measured with GPS in the two communes. The data were stored as gpx-files and analyzed through various online tools, including Google Earth Pro and Landsat images developed by Hansen et al. [55] at a resolution of 30 m. This gave us an overview of changes in each measured land plot, over the 2000 to 2014 period. In addition, feeding these data into GIS ArcMap base maps provided by the LEAF project, gave us information about the types of forest categories in the various locations.

There are, of course, methodological challenges in combining time series data of this kind, with cross-sectional household income data, since household socio-economic factors change over

⁵ Categorizing the households based on total net income (including PES) gave a different distribution of households as compared to without PES. When running the total income model, 16 households were categorized differently as compared to without PES.

time. We proceeded to use these data, with some caution, but we believe it is valuable in developing an indicative estimate of the average rate of forest-cover loss due to small-scale livelihood activities related to coffee production. Combining it with in-depth interview data on the coffee production system helps to contextualize policy discourses around the drivers of deforestation and environmental degradation.

3.4.3 Investigating policy effects and implications

The study investigated the effects of PES payments on livelihood and land use within various household categories. We assumed that the poorest households had been prioritized for PES and that this would have contributed to reducing income inequality in the communes. We used the PES proportion of total income as a measure of its importance in terms of poverty reduction. In order to consider to what degree different land use and investment rationales might be attributed to the social and cultural status of households, we measured areas cultivated, input investments made, and yields per unit of land, and how these variables relate to income levels. The different ways in which various households have access to and manage land, provided insights into the degree to which links between income levels and pressure on forests may be substantiated. This helped us to reflect upon the relevance and prospects of success for ongoing and planned REDD+ activities in the area.

Key strategies of PES and REDD+ are also to improve citizen environmental ‘knowledge’ and ‘awareness’. Measures to accomplish this include information campaigns, stakeholder meetings, and the use of media (television, radio, newspapers) [22]. For measuring changes in environmental attitudes, we developed a composite indicator. This indicator combines six different questions regarding awareness and perceptions of the value of forests and the conservation of forests. The responses were valued along a Likert type scale, (1-5 scale, 1 implying low awareness, 5 high). The responses were merged into an attitude awareness indicator where the potential score is between 6 and 30.

3.4.4 Misrepresentations of coffee income – a methodological challenge

A particular challenge we faced was that about 25% of the households reported net negative agricultural income. This may be or lead to a source of misrepresentation in the wealth ranking of households, when the estimate of annual income is based on one particular year. In many cases, households will incur high initial, investment costs in establishing new coffee plantations which do not yield any crop income for three to five years [56]. The survey results show that many households established new plantations in 2010/2011, implying high input costs in terms of fertilizers and pesticides, combined with very low income (if any), resulting in negative agricultural income in the survey year (2014). The new plantation efforts in 2010/2011 may be explained by favorable *robusta* coffee market price trends, and expansive population trends, especially in Da Chais. Similar results have been found in other studies carried out in the area, such as the one by Tran [22]. We therefore believe that the negative income can be attributed to the “decoupled” or “disjointed” nature of costs and income distribution that accrued differently for various households over the time leading up to the survey.

In order to adjust this misrepresentation to a ‘smoother’, more long-term income measure, we calculated a mean income value per ha, based on the mean gross value of coffee production of the households that produce coffee on their plots. We found that the mean gross coffee production was 3,664 kg per ha (on a total area of 82 ha across the sample). We also found mean net

investment to be just over 17.0 million VND per year, which conforms well with the national cost figures presented by Thang et al. [56] of an average of 16.9 million VND per year (approximately 846 USD). Based on this, we calculated the average net income per ha to be about 4.8 million VND per year.

We used these figures as an indicator of the net coffee income by household, multiplied by the land available per individual household. In this paper, we refer to this measure as the ‘coffee index-adjusted net income’. We then used this measure to categorize households into three, equal-sized income groups. The income adjustment caused 25 households to change income groups, in most cases moving one level either upwards or downwards. In order to maintain transparency in the analyses, the descriptive data (in Table 1) contain both the mean ‘indexed’ and ‘actual’ income values. We retain, however, the ‘index adjusted income’ in the statistical analyses (involving income groups), because we believe that it gives a more realistic picture of wealth and income levels amongst households in the communes in the study area.

4. Results and discussion

The objectives of this paper are threefold. First, we present general household characteristics and income levels, followed by an analysis of livelihood activities and outcomes per income group. The results mainly reflect the findings from the household survey, but in-depth interviews and secondary sources also inform the discussion – particularly in relation to understanding the production structure of the local coffee economy. The results section feeds into a discussion about how households manage resources differently, in order to generate their livelihoods. Second, we measured the relative importance of PES income in household livelihoods, and the degree to which PES participation can be linked to differences between income groups, in terms of income and land use. Third, we explored the coffee economy and land use by investigating the relative importance of coffee production in household economies, and the links between household affluence and the expansion of coffee production into forest land. This discussion also reports on the general organization of the coffee economy in the area. Finally, this section ends with a discussion of future prospects for REDD+ in view of the findings of the study.

4.1 Household characteristics and income levels

The average household size was 5.5 members. The average age of the household head was 43.7 years, with an average level of education of 4.3 years (see Table 1). The level of poverty in the area is high. The mean net income for all households was found to be approximately 48 million VND per annum (Table 1), equaling a mean net income per capita of 8.7 million VND per annum. Generally, this seems- and is- very low (about 1.1 USD per person per day). Nevertheless, seen in a national context, this income level is well above the national poverty rate for rural areas of 4.8 million VND per person per year [57]. Looking at the defined income groups for the study, the income levels again appear to be very low. Both the ‘poor’ (2.7 million VND per person per year) and the ‘medium’ (4.4 million VND per person per year) are below the national poverty rate for rural areas. Nevertheless, the registered low income levels correspond with other income-related studies from the area, such as Tran [22]. There are also substantial income inequalities within the communes. The variations in net income levels demonstrate a range from about 1 to 798 million

VND per household per year. The estimated Gini coefficient of the communes (0.56) shows that this is well above the national average of 0.39.

The main income source in the study area is off-farm activities (64.4%), followed by PES activities (15.6%), and agriculture (13.8%). Forestry (beyond PES) and livestock-related income are small (4.1% and 0.4%, respectively). Forest related income sources are subsistence oriented and predominantly involve collecting fuelwood. The main limiting factor for agricultural production in the area is the extent of available land [22], which partly explains the high degree of off-farm reliance amongst the sampled households. The households reported an average of 1.14 ha of cultivable land each, of which about 0.82 ha (73%) is used for coffee.

Table 1. Socio-economic assets and income sources, Da Nhim and Da Chais communes, Lam Dong Province, Vietnam, 2014 (N=100)

Variable	Mean	Std Dev	Min	Max
Total net income (1000 VND)	48480.72	92810.94	-24000	774000.00
Index-adjusted net income (1000 VND)	47684.75	91823.96	2403.3	789004.27
Off-farm income (1000 VND)	30737.50	94218.92	0	780000.00
Indexed-adjusted agricultural income (1000 VND)	6594.40	7232.19	0	50388.32
Livestock income (1000 VND)	221.60	2649.39	-1000.00	26400.00
Net income: fish (1000 VND)	129.00	831.37	0	6500.00
Net income: forests (1000 VND)	1952.97	3603.71	0	25948.00
PES income (1000 VND)	7432.00	4966.21	0	16400.00
Other environmental schemes (1000 VND)	617.28	2746.17	0	15600.00
Household size	5.45	2.75	2	23
Age of household head	43.66	12.71	23	76
People available to engage in adult labor	3.23	1.98	1	13
Years of education – household head	4.27	4.10	0	16
Total value of assets (1000 VND)	144606.30	339807.40	5000.00	3144000.00
Debt (1000 VND)	34170.00	111399.00	0	1000000.00
Debt:income ratio	1.23	1.25	0	15.26
Total cultivated area (ha)	1.14	0.87	0	4.51
Total area of homeland (ha)	0.35	0.43	0	1.97
Area of coffee production (ha)	0.83	0.74	0	4.22
Gross coffee production (kg)	2887.17	3911.84	0	300000.00
Input investments per ha (1000 VND)	15761.77	14734.69	0	65502.18
Coffee production (kg) per ha	3423.30	3110.30	0	12455.52
Average distance to land plots (km)	1.68	2.17	0	10.43
Area of land cleared (ha) (2000-2014)	0.35	0.43	0	2.04
Area of uncertified land cleared (2000-2014)	0.28	0.42	0	2.04

USD1=VND 21,000

We ran an ordinary least squares (OLS) analysis to test the causal relationship between access to assets and total income ($R^2=0.4932$; $F=4.8998$; $p<0,0001$) (Table 2). We found income to be positively correlated with the level of education of the household head, distance to land plots in general (regardless of whether it was ‘homeland’ or ‘hillside’), and the total area of certified

agricultural land (homeland). We found a negative correlation between net income and the total cultivated area, indicating that the higher net income the less land households cultivate. On the other hand, and contrary to policy assumptions about the ‘poor’ and ‘ethnic’, the OLS indicates a positive correlation between income levels and clearing of land, namely that the households with higher income had cleared more land in the 2000-2014 period. Household participation in PES also correlated negatively with income. This is as expected, considering the expressed priority to include poorer households in PES.

Surprisingly, the OLS indicates that female-headed households generate significantly more income than male-headed ones (Table 2). However, this result is due to an outlier observation in the sample. The richest household in the sample was female headed, with about 798 million VND in total net income per annum. Omitting the outlier and re-running the test eliminated the correlation between gender and income. This also eliminated the correlation between income and location (village) (namely, that location influences income levels). Since the outlier household was also ethnic minority (*K’ho*), the omission yielded a positive correlation between ethnic affiliation and income (the *Kinh* earning on average more than the *K’ho*).

In summary, the descriptive data indicate that income levels are low, with substantial differences between the wealthiest and the poorest households. The agricultural and forest-related income levels are also low. According to official statistics from 2014, the provincial mean income from agriculture, forestry and fishery was 982,000 VND per capita per month [58]. By comparison, the survey data demonstrate an average per capita income from the agriculture and forestry of about 130,000 VND per household.

Table 2. Total income by socio-economic assets, Dha Nhim and Da Chais communes, Lam Dong Province, Vietnam, 2014 (N=100)

Term	Correlation Estimate	Std Error	t Ratio	Prob> t
Intercept	3221.43	40867.85	0.08	0.9374
Village 1	-24876.99	17209.08	-1.45	0.1521
Village 2	-31809.43	14681.07	-2.17	0.0332**
Village 3	3572.64	13956.88	0.26	0.7986
Ethnicity (dummy = <i>K’ho</i> ethnicity)	8629.39	16967.99	0.51	0.6124
Size of household	5657.58	5030.02	1.12	0.2640
Sex of household head (dummy = male)	-39948.57	14859.90	-2.69	0.0087***
Age of household head	469.95	677.98	0.69	0.4902
Adult labor	-5471.05	7347.30	-0.74	0.4586
Years of education of household head	6738.28	2456.36	2.74	0.0075***
Collective work Y/N (dummy = yes)	-6407.06	8595.69	-0.75	0.4582
Total value of assets (1000 VND)	0.01	0.03	0.44	0.6631
Debt (1000 VND)	-0.05	0.08	-0.64	0.5210
Total cultivated area (ha)	-39122.85	13779.20	-2.84	0.0057***
Total area of homeland (ha)	72656.29	24393.56	2.98	0.0038***
Average distance to land plots (km)	9231.01	3211.01	2.87	0.0051***
PES participation (Y/N) (dummy = yes)	-28299.79	14632.62	-1.93	0.0566*
Area of land cleared (2000-2014)	91889.36	27096.12	3.39	0.0011***

R²=0.4979; F=4.8098; P<0.0001; p-values estimate significance for differences between household assets: *** is significant at p<0.01; ** is significant at p<0.05; * is significant at p<0.1.

Breaking the income data down according to income levels – ‘poor’, ‘medium’ and ‘better off’ – provides more detailed insights into livelihoods and land-use dynamics for the various income groups. The results are presented in Table 3. The ‘better off’ households reported significantly more assets and resources than did the ‘poor’ and ‘medium’ ones. The level of education of the household head is also on average higher for the ‘better off’ than for the other two income groups. The differences in average household size and the average age of the household heads were statistically insignificant.

Table 3. Socio-economic characteristics, livelihood activities and outcomes by income groups (N=100), Da Nhim and Da Chais Communes, Lam Dong Province, Vietnam, 2014

Variable	Poor	Medium	Better off	p-value
Household size	4.88	5.64	5.85	0.1276
Ethnic minorities (%)	91.20	100.00	63.60	0.0004
Age of household head	44.00	42.18	44.79	0.8030
Years of education of household head	3.53 ^b	3.15 ^b	6.15 ^a	0.0066
Total value of assets (1000 VND)	80080.88 ^b	77465.76 ^b	278227.70 ^a	<0.0001***
Debt (1000 VND)	21617.65	19212.12	62060.61	0.0866*
Net income (coffee index-adjusted) (1000 VND)	13081.92 ^b	24803.05 ^b	106217.86 ^a	<0.0001***
- Off-farm income (1000 VND)	333.82 ^b	4155.76 ^b	88644.24 ^a	<0.0001***
- Paid work (1000 VND)	108.82 ^b	3422.42 ^b	78352.73 ^a	<0.0001***
- Other business (1000 VND)	11.76 ^b	0 ^b	10012.12 ^a	<0.0001***
- Income transfers (1000 VND)	213.24	733.33	279.39	0.8954
- Indexed-adjusted agricultural income (1000 VND)	2925.35 ^b	8611.93 ^a	8357.09 ^a	0.0007***
- Indexed-adjusted coffee income (1000 VND)	2294.47 ^b	5090.87 ^a	4501.64 ^a	0.0072***
- Agricultural subsistence income (1000 VND)	630.88 ^b	3521.06 ^a	3855.45 ^a	0.0153**
- Forest related income	1296.27	2525.42	2057.13	0.3961
- PES income (1000 VND)	8529.41 ^a	9018.18 ^a	4715.15 ^b	0.0011***
Total cultivated area (ha)	0.70 ^b	1.47 ^a	1.27 ^a	0.0059***
Total area of homeland (ha)	0.26	0.35	0.44	0.0878*
Area coffee production (ha)	0.48 ^b	1.06 ^a	0.94 ^a	0.0072***
Gross coffee production (kg)	1891.18 ^b	2757.58 ^{ab}	4042.94 ^a	0.0123**
Input investments per ha (1000 VND)	17880.20	12783.43	16557.50	0.6793
Coffee production (kg) per ha	3836.37	2859.65	3561.37	0.7006
Average distance to land plots (km)	1.21	2.41	1.83	0.3202
Area cleared for agriculture (2000-2014)	0.23	0.42	0.40	0.0956*
Area of uncertified land cleared (2000-2014)	0.11 ^b	0.34 ^a	0.40 ^a	0.0033***
PES participation (%)	88.2 ^a	100 ^a	63.6 ^b	<0.0001***

p-values estimate significance for differences between income groups: *** is significant at p<0.01; ** is significant at p<0.05; * is significant at p<0.1

a,b,c, Bonferroni test; groups with different letters are significantly different from each other (p<0.05)

USD1 = VND 21,000

4.2 PES income and land use

There are large variations in the share of income by activity for the different income groups. The ‘better off’ have on average much higher off-farm income (83.0% of their total income and only 7.0% from agriculture) than the other two groups – the ‘poor’ and the ‘medium’ earn about 2.5 % and 16.8% respectively off-farm. Off-farm income is derived from paid work, business activities and remittances. In relation to ‘paid work’, the types of jobs vary – the ‘poor’ and ‘medium’ tend to be hired frequently for agricultural work on the land plots of other households’ (such as for commercial flower and vegetable production, and coffee production), while the ‘better off’ work in the commune administration, as teachers, or in the tourism sector. Business-oriented activities are carried out almost exclusively by the ‘better off’ families. All business households in the sample were ethnic *Kinh*.

PES income are relatively high in the area. The findings from the survey data regarding linkages between PES and performance objectives are still mixed. In the surroundings of the Bidoup-Nui Ba National Park, anecdotal evidence shows that the number of ‘violations’ has decreased since the start-up of PES [21, 22]. The positive correlation between income and land clearing found in the OLS may also demonstrate a link between the level of PES payments and households’ expansion of agriculture into forest land. When we compared PES payments across income groups, we found that the ‘poor’ and ‘medium’ households receive the highest PES payments. This indicates that in terms of the poverty reduction objective of PES, PES has contributed to reducing income inequalities in the area. In other words, PES is relatively speaking more important for the ‘poor’ households than for the ‘medium’ or the ‘better off’ ones (respectively 65.2%, 38.7%, and 4.4% of total net income). Nevertheless, the ‘medium’ and the ‘better off’ households cultivate more land for coffee on average, and in this sense, PES has excluded an important segment of households that are more capable and more likely to expand coffee production.

A simple binary comparison of households in terms environmental knowledge and awareness also showed that there were insignificant differences between the PES (22.8) vs. non-PES beneficiaries (22.3) households ($p=0.5237$). This partly also questions the positive effects of the knowledge and awareness related activities carried out as a part of the PES scheme.

4.3 Livelihoods, land use and coffee production

The land-clearing data indicate that the households in Da Nhim cleared more land on average than in Da Chais in the 2000-2014 period (0.24 ha more on average). Much of the forest land clearing in Da Nhim is most likely attributable to the commune’s distribution of forest land for coffee plantations. Here the authorities have deliberately chosen to distribute forest land certificates for coffee plantations to relieve the pressure for improved livelihoods, to provide more land, and to encourage the expansion of coffee production towards areas perceived as less vulnerable in terms of the provision of ecological services. If we subtract the certified legal land clearings organized by the authorities, this gives us an indicative measure of the level of what is officially perceived as illegal land clearings in the area (hereafter referred to as ‘uncertified land clearing’). The average area per household across the two communes is 0.28 ha (Table 1), or 0.33 and 0.23 ha in Da Nhim and Da Chais respectively. This may indicate that access to land is an even more pertinent political issue in Da Nhim than in Da Chais. Considering land use in relation to the various income groups, the ‘medium’ and the ‘better off’ households access and cultivate

more land on average than the 'poor' (1.47 and 1.27 hectares vs. 0.70 hectares respectively). On average, 72.8% of the cultivated land is used for coffee production. The 'medium' households cultivate most land, both in total and for coffee production. The 'poor' households have less land than the other income groups. A modest significant difference in terms of land clearing in the 2000-2014 period was also detected between the groups (Table 3); that is, the 'poor' clear slightly less land than the other groups. Interestingly, however, if we compare income groups in terms of the level uncertified land clearing in the 2000-2014 period, this is significantly lower for the 'poor' and highest for the 'better off' (though not significantly different from the 'medium'). No significant differences were found in input investments or in productivity between the groups. Further, in terms of output per input investment (that is kg of coffee per 1000 VND), there were no big differences between the groups (i.e. 0.21 for the 'poor', 0.22 for the 'medium' and 0.22 kg/1000 VND for the 'better off').

The data collected during the in-depth interviews indicate that illegal clearing of forest land and land transactions are more complex processes than revealed through the survey data. Land clearing and land transactions often take place in a step-wise process, where the poorer households are paid by the richer and more business-oriented households to clear new land. Thereafter the land is sold to the other coffee producing households. This was also observed in other studies, such as Vu Tien Dien and Grais [37] and SNV [59]. Such transactions mostly likely represent a substantial (illegal) off-farm income source for some of the 'business households' in the sample, a finding which was not well captured through the survey data⁶.

Business activities are carried out almost exclusively by the 'better off' households, and all of them are ethnic *Kinh*. They frequently own and run small or medium-sized businesses in the communes, typically shops where they sell food or agricultural articles, sometimes combined with cafés or restaurants. These households also provide other farmers with key agricultural inputs, and act as intermediaries for the sale of coffee. In these transactions, inputs are frequently sold on credit and the debt is then repaid in installments and interest in the form of a supply of coffee beans. In such cases the debtors typically receive a lower price for their coffee compared to selling it directly in the markets (approximately 20% lower than the market price) [6]. This often results in the poorest households being caught in a vicious circle of debt and payments with inflated interest rates.

From a vulnerability point of view, concerns have been raised about the debt situation related to coffee production in the area [6]. The survey findings in this study demonstrate that the household debt levels are indeed high. Households have on average about 34 million VND in debt – some 70.5% of their total annual income on average (Table 3). Even though the differences in debt levels between households are statistically insignificant, the debt-to-income ratios for the 'poor' are much worse than for the 'medium' and 'better off' households (165% versus 77% and 58% respectively). The levels of interest rates on debt repayments are similar between the different groups.

The better-off group hence has a stake in sustaining the current mode of production in the area, which may represent a major underlying factor for land-use change and forest encroachment in the area. Coffee production should hence be understood within a broader political, economic and historic context, in which small-scale coffee producing farmers are part of a complex coffee economy, influenced locally by the business-oriented segment of the population that trades coffee, key inputs and land. This system has been traditionally supported by the state, not only through

⁶ The numbers may have been reported as 'business activities', but they were not revealed as income from land transactions.

input support and extension services, but also directly through the state-owned VINACAFE. This is the largest coffee trading and manufacturing company in Vietnam, accounting for 20 to 25% of the country's coffee exports.

4.4 Implications and prospects for REDD+

While we agree in principle with the prominent role of the coffee sector as a driver of land-use change in the province, we challenge some of the predominant perceptions linked to the underlying poverty and livelihood-related explanation models found in key policy documents and discourses.

First, the findings question the role of smallholder coffee production in relation to deforestation. Considering the rate of land conversion evidenced through the survey, gives reason to question the relative role of smallholder production in the overall picture of deforestation in the province. The land-use change data for the household plots in the 2000-2014 period indicate an increase in agricultural land of 0.35 ha (constituting about 31% of the total amount of agricultural land) (Table 1). This amounts to about 0.025 ha per household per year over this period. A simple calculation of the average total annual forest loss due to livelihood activities in the two communes yields an answer of 22.9 ha. With total forest cover of the two communes of 53,546 ha, the average loss due to household livelihood activities should be around 0.043% per year, which is well below the provincial average (about 0.5 ha per annum according to official figures from the Forest Inventory and Planning Institute [39]). These results are of course indicative figures, but considering that they are based on the current population of the communes, and since the population trend of the province has been increasing in recent years, the figures are probably not underestimating deforestation. It should also be noted that there are most likely differences in land-use practices and needs between locations in different contexts. The focus in REDD+ should hence also be on contexts where larger-scale plantation mode of coffee production is taking place.

Second, PES experiences should critically be reviewed and modified in REDD+. The way REDD+ has evolved is, to a large extent, symptomatic of how domestic REDD+ policies have evolved from global approaches and ideas, and in this case from an idea about results-based PES to more pragmatic national and local adaptations of broader policies and measures [2]. REDD+ in Vietnam in general, and Lam Dong in particular, is by-and-large viewed as a coordination mechanism for ongoing and future activities that may contribute to the reduction of GHG from forests. Hence, we foresee that the current PES setup will play a key role as a distribution mechanism for financial benefits, particularly in relation to forest conservation, thus making the experiences with PES since 2008 in Lam Dong particularly relevant for future REDD+ prospects.

When comparing PES income with coffee production per unit of land, the opportunity costs of coffee production very significantly outnumber those of PES. The net average income per hectare per year from PES is about 298,000 VND, while alternative agricultural land use would constitute about 5.7 million VND. Thus, it seems reasonable to assume that any causal links between the (low) level of PES payments and environmental performance are highly uncertain. In order for a performance-based PES or REDD+ mechanisms to succeed sustainably, the opportunity cost levels of current land uses must be addressed. If PES has had any impact, it is most likely attributable to increased control and patrolling, and information campaigns that reach all households (for example, newspapers, television, radio, etc.), rather than participation and performance-based payments (effects that were also partly questioned by comparing the environmental awareness scores between the beneficiary and the non-beneficiary households – see 4.3 above).

Third, the ‘poor’ deforest the least. Our findings demonstrate that the ‘poor’ households are the ones carrying out the least uncertified (illegal) land clearings, and are hence not the group of households causing the most deforestation in the study area. The ongoing and planned REDD+ activities seem, largely, to recognize some of the underlying and structural factors of deforestation in the area, more so than has been the case with PES. For example, the establishment of the Village Development Funds may have the potential to stimulate livelihood diversification and relieve poor farmers of debt dependency in the form of high interest rates charged by business households in the communes. Nevertheless, as with PES, the focus on the ‘poor’ ethnic minorities and their ‘destructive’ activities is also a key component of REDD+, and the lack of comprehensive analyses of the coffee sector at large is striking in plans and policies at all levels.

An underlying assumption of current REDD+ activities is also that training and capacity building for better and improved practices will increase households’ agricultural investment returns, and in turn reduce the pressure on forests. Our livelihood analyses question the assumption that the production of ‘poor’ (and ethnic minority) households is economically and agronomically less efficient than that of wealthier households. Our findings do not reveal significant differences in levels of input investments, nor production per ha; and the data on the links between income levels and the expansion of production into forest land point to the higher income segments of the population. The effects of increasing the productivity of global commodity crops, such as coffee, are also uncertain in terms of decreasing pressure on more marginal lands, considering the high price elasticity of production levels and volumes [60].

Fourth, issues of tenure and access to productive land need to be addressed. Our findings point towards land being a major limiting factor for increased livelihood income. Issues related to sustainable access to productive land should be addressed in order to stop or constrain the illegal clearing of forest land. Improved land-use planning and securing legal and sustainable access to land for the poor and ethnic minority households should be a key component in all strategies aiming at relieving pressure on strategically important forest resources. This has been done in Da Nhim, to a certain extent, and could be a viable approach for directing coffee production strategically towards the less vulnerable areas in terms of environmental and carbon values. The interests of the business-oriented segment of wealthy households, who have a major stake in coffee-related businesses and (illegal) land transactions, seems to be a cementing factor for the current mode of production. These underlying factors need to be addressed before issues related to the expansion of coffee production into forest land can be solved in a sustainable way.

5. Concluding remarks

The study has explored some of the predominant underlying policy ‘orthodoxies’ on the drivers of land-use change and forest encroachment related to small-scale coffee production amongst ‘poor’ and ‘ethnic’ households in a PES and REDD+ zone in the Lam Dong Province of Vietnam. Such perceptions are not endemic to Vietnam, but are frequently found in environmental policy schemes and discourses globally [20]. The study has explored drivers of land-use change by making use of a livelihood framework. We found that land is the main limiting factor for agricultural production and livelihoods, and most households in the study area need to supplement agricultural income with off-farm sources. Both the ‘medium’ and the ‘better off’ households have access to a more diversified set of off-farm income sources, compared to the ‘poor’, who depend more upon agriculture for their livelihoods, both overall and in terms of coffee production. Policy discourses on the drivers of land-use change in the Central Highlands of Vietnam seem to neglect

various underlying factors that drive the coffee production. The findings of this study also indicate that largely the business-oriented households in the study area control the coffee economy and land transactions related to the expansion of coffee production.

In terms of links between land-use change and poverty levels, the data showed that in absolute terms, the 'medium' and the 'better-off' households cultivate most land, both in total and for coffee production. The data also indicate that these households have cleared more forest land for agriculture over the years than the 'poor' households. Especially if we consider the uncertified ('illegal') clearing, the 'poor' deforest the least. Thus, the focus on the linkages between poverty amongst the ethnic poor and coffee-related forest encroachment seems to be overrated in PES and REDD+ policies and discourses. The main argument of this paper is therefore that, in order to enable a more comprehensive understanding of land-use change and its management, the focus should be expanded beyond the poverty-environment nexus.

The expansion and development of the coffee sector in Vietnam must be seen in the historic and political context of marginalization of, and control over land, resources and people [21, 27]. Historically, the general deforestation in the Lam Dong province has often been related to the large migrations of people from the north who came to populate and develop the province [25]. They represent a group of households that over the years have been encouraged by the Government of Vietnam to migrate, settle and 'develop' the region. This study has demonstrated that business-oriented households, together with other commercial actors such as the state-owned coffee corporation (VINACAFE), are in control of the coffee sector. Consequently, the current focus of PES and REDD+ on payments to 'poor' and 'ethnic' households, combined with education, information campaigns and increased levels of forest patrolling, do not seem to be sufficient in trying to solve the underlying issues at stake.

Coffee production requires a long-term investment – and reverting to subsistence production is not a viable option for most households, considering their integration into a market and 'cash' economy. Solutions for attaining sustainable livelihoods need to address the critical lack of productive land in the area. Improved land rights and land-use planning seem to be warranted. The current development and infrastructure plans, for example, of larger-scale plantations of rubber in the Central Highlands, also require more attention [61]. A focus on creating realistic and viable off-farm livelihood alternatives, other than being involved in the very dominant coffee sector, is most likely an important ingredient in any policy scheme that aims to reduce pressures on forests.

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Paper 4

Cultivating forests: Exploring the productive values of forest land in a reforestation zone of northern Vietnam

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Abstract:

The paper challenges a predominant forest-agriculture dichotomy perception in policy-making and research in Vietnam. Such dichotomies are not endemic to Vietnam, but permeates the whole climate and forest debate globally. It encompasses a perception that forests are of higher value kept standing and that agricultural practices, forest conservation and sustainable use of forests are mutually excluding activities. The study is based on a survey carried out in the Province of Bac Kan in northern Vietnam, and applies a livelihoods framework to investigate the multiple values of forest lands in household economies. The case demonstrates complexities of adaptations to forest-sector policies, and that households in different institutional and agro-ecological locations use landscapes differently along a forest-agriculture continuum. The findings on multipurpose uses of forests may have important implications for climate related forest policies, such as REDD+ and REALU. Policy makers should engage with people and local communities, their social institutions and agricultural practices, and look at context-specific approaches for integrating the objectives of conserving trees, increasing carbon stocks and enhancing the total productivity and total outcomes and values of landscapes. The study recommends inter-sectoral and multi-stakeholder policy approaches integrating and mainstreaming multiple objectives, including forestry, agriculture, energy and environmental services, such as food production, carbon capture and storage, water provision, and biodiversity conservation.

Key words: Vietnam; forest landscapes; livelihoods; REDD+; REALU

1 Introduction

The role of conserving forests in reducing the emissions of green-house-gases (GHG) and maintaining the environment has received increased attention over the past years. Recent estimates of deforestation and forest degradation's contributions to global greenhouse gas emissions are around 13% (Le Quéré et al. 2014). Consequently, new and so-called flexible mechanisms have been developed to GHG emissions from forest landscapes, including the Clean Development Mechanism and, more recently, schemes for Reduced Emissions from Deforestation and Forest Degradation (REDD+). Along the way, however, REDD+ has evolved from focusing on deforestation only (RED), to adding an additional 'D' to also include forest degradation, and, finally, the '+' was included to also capture positive change within forests in terms of reforestation and afforestation activities (also known as *carbon stock enhancement*), and sustainable management of forests. Adding the '+' to REDD was by many seen as particularly important for achieving poverty reduction, linking conservation, climate change and development (Ravindranath, Murthy, and Samantaray 2012).

Within REDD+ lies implicitly the assumption that many forests are of higher value kept standing than harvested. In this sense, REDD+ has contributed to amplifying a predominant and - by many perceived as an inconsistent - forest-agriculture divide (Palm 2014). Many have thus called for so-called 'landscape approaches' or 'integrated landscape management' that can link social, economic and environmental objectives across scales (Sayer et al. 2013). In a climate context, such approaches are referred to as Reduced Emissions from All Land Uses (REALU) (Noordwijk et al. 2009, Bernard et al. 2013).

What is a 'forest' and what is the distinction between the 'natural' and 'cultivated', are frequently subject to empirical and theoretical debates (Bernard et al. 2013, Kareiva, Lalasz, and Marvier 2011). Landscapes are in many ways social constructs, both physically through how landscapes are materially formed through human activities, and culturally, through how landscapes are interpreted and perceived by humans interacting with and inhabiting them (Krogh 1995). In different countries, forests are found under different institutional management arrangements, both in relation to tenure and in relation to its use. Forest categorizations and zoning may have important implications for what type of activities that are allowed on the different types of land, ranging from strict protection in national parks to agroforestry activities and plantations in the productive zones. Promoting sustainable livelihoods and active landscaping demand context-specific policies and approaches, taking the variety of productive

values of landscapes into account. When agriculture and forest development goals are linked together in ‘climate-smart landscapes’, measures to reduce deforestation and GHG emissions may also be more effective (Scherr, Shames, and Friedman 2012).

In Vietnam, small-scale forest plantations have had a special position in policies as a tool to increase forest cover and increase livelihood income from forest products (Long and Vu 2011). The distinction between what is agriculture and what is forest land is also strongly expressed in Vietnamese research and policy discourses, with a strict distinction between agriculture and forest land use (see e.g. SRV 2009, UN-REDD 2012). Such landscape ‘silos’ are also institutionally reflected in separate forest and agriculture organizational structure and in policy domains. When exploring real, on-the-ground landscapes, however, land use categories will be overlapping, fluent and flexible, and the appearance, use and perceptions of landscapes differ, even within geographically short distances (Castella and Dang 2002). Farmers explore and use landscapes within a continuum where forest land plays a vital role not only for extracting trees and other forest resources, but also for households’ agricultural production. In such contexts, the distinction between what is environmental and what is ‘cultivated’ income becomes increasingly blurred and the values “in-between” will face the risk of being neglected or forgotten in policy planning and implementation.

This paper explores the role of forest land in household livelihood adaptive strategies in a reforestation zone in the Bac Kan Province of northern Vietnam. We discuss and challenge dominant agriculture-forest policy dichotomies, arguing that households use landscapes within a continuum where forest land have a vital role in household economies - in many ways. The multiple use of forests and forest land in households’ livelihoods is explored, and the interaction between livelihoods, landscapes and forest policies is laid out. This is done by applying a livelihood framework (LF) (see Ellis (2000) and Scoones (1998)). According to the LF, livelihood assets are combined to form livelihood strategies with particular outcomes (Scoones 1998, Ellis 2000). The paper applies the framework at the household level, assuming that households combine different capitals such as land, labor, and financial, physical and social capitals to generate income and form specific livelihood strategies. Within certain (institutional and physical) contexts, planting forests and having access to forest lands could be viable livelihood strategies that could be exploited in various ways. The paper applies the LF to explore the diverse uses and outcomes that forests provide for in household livelihoods. More concretely, this implies looking at the relative role of different income sources at household level. What is the relative importance of forest income as compared to other livelihood sources,

such as from agriculture and various off-farm sources? And how are different categories of land used differently to generate livelihood income?

The role of 'forest environmental income' in household economies has been investigated by numerous scholars (see e.g. Cavendish 2000, Vedeld et al. 2007, Angelsen et al. 2014, Dokken and Angelsen 2015, Wunder, Angelsen, and Belcher 2014), also in the Vietnam context (McElwee 2008). Sjaastad et al. (2005: 37) define environmental income as 'natural rent realized through consumption or alienation within the first link of a market chain'. Conceptualizations and studies of forest environmental income do therefore not include income from forest plantations (Wunder, Angelsen, and Belcher 2014). Nevertheless, identifying and distinguishing 'natural' from 'cultivated' income is challenging and complicated in practical empirical research. How can for instance cultivated trees within forests be distinguished from natural trees within agricultural landscapes in income surveys? And in terms of agricultural production, what is the relative importance of what is produced on lands denominated for agriculture versus the forest lands? Studies have found that there are big differences in strategies and adaptations between different contexts and communities (Castella and Dang 2002). Cultivating and investing in devolved forest land have for instance been found to be an important livelihood strategy for households with low access to paddy lands in the Bac Kan Province (Castella et al. 2006). Studies have also found that better-off households are more likely to possess, invest and grow trees on plantation forest land (Clement and Amezaga 2009, Sikor and Baggio 2014), and that investing and generating sustainable income from forestry activities in general are not an important income strategy for the poorest segments of households (Sikor and Nguyen 2007, Clement and Amezaga 2008, Sikor 2011). At the same time, responses and adaptations to the policies of reforestation and devolution of forestland have varied between locations and households (Castella and Dang 2002, Clement and Amezaga 2008).

The study takes a broad perspective and looks at the multiple effects of policies related to the distribution of forest lands and planting of trees among small-scale rural households. The perspective pursued in the paper is that policies, such as forest tenure reforms and reforestation policies, will have to relate and respond to existing institutional structures and agro-ecological contexts (Vatn and Vedeld 2012, Trædal, Vedeld, and Pétursson 2016). Institutions at different levels mediate policy formulation and implementation processes, and through these, policies are interpreted and transformed by actors in multiple ways and with different outcomes and implications for livelihoods and landscapes. Our perception of institutions recognizes the diversity of social phenomena, and the creative effects of interactions between individual

agency and social structures. Cleaver (2012, 2001) refers to these processes as institutional bricolage. Some have coined the interactive processes between livelihoods and landscapes resulting in heterogeneous mosaic landscapes as ‘productive bricolages’ (Ros-Tonen 2012). Exploring household income and livelihood diversification strategies provides us with insights into households’ responses to policy instruments, and to how they utilize landscapes differently along the forest-agriculture continuum. The findings may have important implications for REDD+ and other schemes for Payment for Environmental Services (PES), and for REALU in multipurpose forest landscapes in Vietnam and elsewhere.

Concretely, the paper discusses four main research questions:

- 1) What is the role of forest land in household livelihood adaptation strategies?
- 2) How have households in the study area adapted differently to policies related to forest land use?
- 3) How do contextual factors influence household adaptation strategies in the use of forest land?
- 4) What are the implications of the findings for innovative market-based policy mechanisms, such as REDD+ and other PES schemes?

2 Forest sector policy development in Vietnam

Vietnam has since long before the conception of REDD+, implemented policies relevant for the sustainable forest management and carbon stock enhancement components of REDD+. A shift in forest policies took place in the early 1990s when measures to increase forest cover and conserve existing forests, were implemented at a large scale in the country. These included the 327 and the 661 Programs, the latter also known as the 5 Million Hectares Reforestation Program (5MHRP). The target was to increase the national forest cover from 28% up to the pre-decolonization level of 43% (Sam et al. 2004). The policies were seen as a response to a serious loss of forest cover and environmental degradation in the post-colonial period up until about 1990. The policy shift was also intended to promote increased incomes from forests and forestry activities for households and communities. While the focus of the 327 program was predominantly on the distribution of trees and reforestation, the 5MHRP also included the

devolution of rights to forest land for households and communities (Clement and Amezaga 2009).

In the 1993 revision of the land law, individual households were allowed to request and receive land use rights to forest land (McElwee 2016). The individualization of forestland ownership must be seen as a prolongation of the *doi moi* policies of the 1980s, when years of collective agricultural production was replaced with individual production, opening up for market production, and for individual rights to agricultural lands (Castella and Dang 2002, Sadoulet et al. 2002). The collective system had for years caused sub-optimal production levels of rice, and widespread expansion of shifting agriculture in the uplands of northern Vietnam, such as in Bac Kan (Tachibana, Nguyen, and Otsuka 2001, Castella et al. 2005). Here the shift in tenure systems stimulated more intensive production in the lowland areas, and arrested uncontrolled migrations and expansion of shifting agriculture in the upland forest areas since most forest land was distributed to individual households. Nevertheless, in many places the majority Tay ethnic group who had traditionally been using the lowland areas for rice production, reclaimed the rights to their lowland ancestral paddy fields (Fatoux et al. 2002). This had serious implications for the other ethnic groups, such as the Dao and the Kinh. Even though lowland rice production became the ‘norm’ and objective for all households regardless of ethnicity, many households had to return to shifting agriculture in the uphill forest areas due to the lack of lowland fields (Castella et al. 2002). These activities were, however, now limited to the respective households’ forest areas, which in combination with an increasing population, caused shorter fallow-periods, soil exhaustion and decreasing yields (Castella et al. 2002).

In the Law on Forest Protection and Development, forests were also categorized into *special use*, *protection* and *production* forests (Long and Vu 2011), with implications for what type of activities that were to be allowed on the various types of land, ranging from more to less strict protection (McElwee 2016:109). While plantations and forestry activities were reserved for the *production forest*, conservation values of forests were meant to be addressed through the other two categories. Forest reserves and national parks were categorized as *special use* forests, with the aim of conserving biodiversity and ecosystem integrities, and for scientific and recreational purposes. Protection forests represented something in-between, established with the purpose of conserving certain environmental benefits such as water and energy provision, soil protection and protection from winds and storms. The dual environmental-income goal of the policies can be said to reflect two different, main forestry discourses in Vietnam, namely what has been labelled *forestry socialization* and *sustainable forest management* (Dang, Turnhout, and Arts

2012). While the former emphasized the importance of stakeholder involvement, the latter focused more on traditional conservation and regeneration of forest landscapes. Nevertheless, many have claimed that both in policy discourses and practical implementation, the emphasis has tended to be biased towards conservation values and protection (Dang, Turnhout, and Arts 2012, Clement and Amezaga 2009).

The story of recent forest sector policies in Vietnam is often presented as a successful one, underscored by an increase in forest cover from around 29 to 40% (Long and Vu 2011). Reports on the negative effects of the policies are also numerous. Some have claimed that the extensive use of fast-growing exotic species such as Eucalyptus and Acacia in the programs also contributes to putting the environmental integrity of landscapes at stake (Nikolic et al. 2008, McNamara et al. 2006). Others have also questioned the accuracy of the use of data to document the positive effects the reforestation and afforestation policies have on forest cover in the country (McElwee 2016). The data are based on on-the ground information collected by government forest-rangers, a system that is sensitive to local authorities' interventions that may compromise the neutrality of the data (Nguyen 2013). Studies have also revealed that impacts of the policies have varied between households and locations (Nguyen 2006), and that reforestation and afforestation activities in some places, contrary to its intentions, have caused increased social inequalities (Sikor and Nguyen 2007, Clement and Amezaga 2009) and vulnerabilities (Thulstrup 2014). The policy processes have evolved differently due to various national and local forest policy discourses, contextual factors, and local interpretations of policies in implementation (Sowerwine 2004, Dang, Turnhout, and Arts 2012, Clement and Amezaga 2008). The variations in policy impacts are also a result of multiple adaptations to forest land policy reforms locally, where households are able to find innovative solutions to expand various productive activities on production forest land (Alther et al. 2002). While studies have identified the extensive and multiple use of forest lands in livelihood strategies, few have put numbers on the relative importance of such activities for different categories of households. In this study we investigate how households adapt differently to forest land use policies. We specifically look at what factors determine the decision to use forest lands for agricultural productive activities; to what degree households of different income categories use forest lands differently and what is the relative importance of different activities; and, how do contextual factors impact the use of forest lands in livelihood generating activities.

3 The study area and methodology

3.1 The study area

The fieldwork for the study was carried out in the Province of Bac Kan (Fig. 1). Bac Kan was selected due to its status as one of seven pilot provinces in the national REDD+ program, and as an example of province with net reforestation rate. Bac Kan was established as a province in 1997. Today it has a population of about 308,900 (2008 census), and with a poverty rate of 36,6%, it is one of the poorest provinces in Vietnam (Hoang et al. 2013). The province is characterized by rugged mountainous landscapes, with lowland valleys well suited for the cultivation of rice. The main income source for households is agriculture. Rice (paddy) production is the main subsistence income source for households, but some farmers also sell parts of their produce in local markets. Farmers depend to a large degree on purchased inputs such as fertilizers and pesticides to sustain their paddy production. Some households are also subsidized by the government to sustain two or three crops of rice per year. Off-farm incomes or cash crop production such as tea or edible canna are also strategies to complement the paddy production.

Animal husbandry are mainly buffalo, pigs, dogs, poultry and fish (*ponds*). People keep livestock for subsistence purposes, but a few also run businesses related to pig or dog breeding. Keeping buffaloes has also traditionally been considered a way of storing capital, and as a financial buffer in times of crisis (Nikolic et al. 2008). Buffaloes are also among the few livestock types grazing within forests and fields (on paddy lands after harvest).

The main distinctions in agricultural production in the area are between highland and lowland production systems. These distinctions have traditionally followed the settlements patterns of ethnic groups. While the dominant Tay have mainly inhabited the high productive paddy lowlands, various ethnic minority groups dominated in the highland areas practicing shifting agriculture. The collectivization politics in the post-colonial period, however, to a large extent changed these dynamics (Fatoux et al. 2002). In the study area, the ethnic minorities are of Dao origin. Like most other ethnic upland minority groups in the region, the Dao have traditionally been practicing shifting agriculture, predominantly of maize and cassava. The collectivization of agriculture of the 1980s and forest reforms of the 1990s, implied a ban on the traditional shifting-agriculture practices of the ethnic minority groups (Clement and Amezaga 2008). Today, the Dao too therefore rely on paddy production, but many, also of Tay origin, still rely

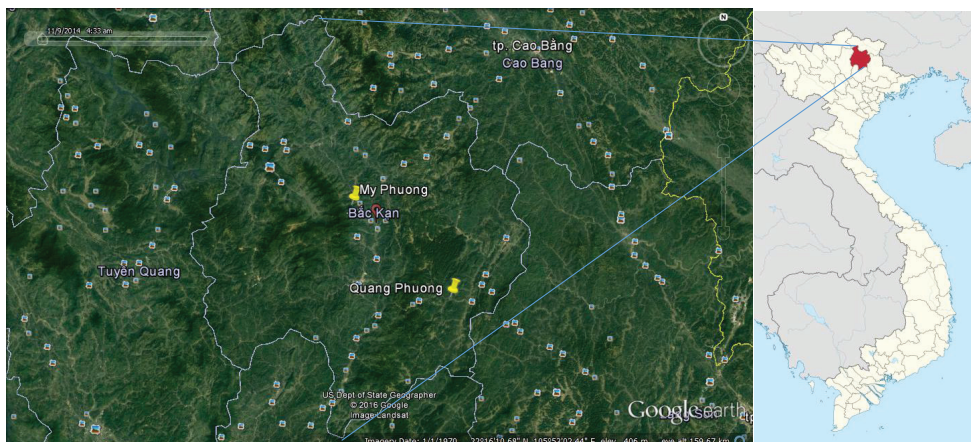
on upland agricultural production to sustain their livelihoods. Due to the limitations of the central government outreach, there has been room for local negotiations and interpretations of the contents and approaches of the laws and regulations implemented allowing for the continuation of various traditional and hybrid practices (Sowerwine 2004, Kerkvliet 2005, Clement and Amezaga 2009). In the study area, many households for instance practice the cultivation of maize and cassava in the early growth-phase of forest plantations, and edible canna or tea plantations are frequently intercropped with trees.

Table 1
Area of forest by categories in the Bac Kan Province, Vietnam, 2012

Forest category	Area (Ha)	Share (%)
Production forest	268336	69.1 %
Protection forest	94125	24.3 %
Special use forest	25581	6.6 %
Total	388042	100%

Source: UN-REDD (2012)

Official statistics indicate that the forest cover has steadily increased in the province over the past decade. The forest cover increased from less than 40% around 2000 to 57% in 2011 (Hoang et al. 2013). This increase is perceived to be due to the governments' reforestation policies, devolution of land rights and intensification of lowland agricultural production are also factors that likely have had a positive impact on forest cover rates (Castella and Dang 2002). Since the early 1990s the communities of Bac Kan have to a large extent been part of the national reforestation program, and formal rights to forest have been transferred to households on a large scale. The major share of forest land in Bac Kan is of production type (Table 1), and around 60% of forest land rights are with households (Do 2014). The majority of households in the study area have formal user rights to forest land through the so-called 'Red Book' certificates, which provide households with 50 years of user rights. Through the government reforestation programs (327 and 661), many households have also received support for establishing tree plantations. In the study area the local species of *magnolia conifera* (locally known as Mõ) and some bamboo and *acacia*, and have been predominant. The Mõ is a local tree species, with the potential of producing timber products of value to the domestic furniture industry. The production is, however, mostly for domestic fuelwood consumption and for selling to the local plywood industry.



Sources: Maps generated from Google Earth and Wikipedia¹.

Figure 1

Communes of My Phuong and Quang Phuong in Bac Kan Province of Vietnam, 2014

3.2 Sample selection

We combined a household survey with semi-structured interviews of government officials at national, provincial and commune levels, NGOs and the national and provincial REDD+ offices. For the survey, four villages were selected, two in the highlands and two in the lowlands. What we have termed villages 1 and 2 are in the My Phuong Commune, while 3 and 4 are in the Quang Phuong commune. Villages 1 and 4 were ‘upland’, while 2 and 3 lowland. Village 1 was inhabited by Dao, while the three others were Tay. The main reason for this selection was that ‘highlands’ and ‘lowlands’ are frequently framed as the main agro-ecological production zones in the province. The different contexts were hence assumed to imply different physical and institutional conditions for livelihood adaptations and effects of forest policy implementation.

We randomly selected around 25 households from each village, yielding a total sample of 100 households. Since the village sizes are different, the relative size of the sample varied from about 25% to 100%. The smallest village was a highland Dao village, with 22 households. Here all households were included in the survey. Interviewing households (normally the household head and/or spouse) provided us with data on income and various other socio-economic characteristics, and land use practices. For each individual household, we collected productive

¹

https://en.wikipedia.org/wiki/B%E1%BA%AFc_K%E1%BA%A1n_Province#/media/File:Bac_Kan_in_Vietnam.svg, accessed January, 2016.

data plot-wise in order to understand land use practices and incomes from different categories of land. Information about the size of households' agricultural land was collected from land registries or from land certificates in the households' possession. This was combined with GPS field registration of location and measurements of land sizes of cultivated areas inside of forest land (as demonstrated in Fig. 2).

3.3 Income conceptualization

All income calculations were based on the sums of households' cash and subsistence income-generating activities over the past 12 months. Households were sub-divided into three equal-sized groups according to the level of income (poor, medium, less poor). Subsistence agricultural products were valued according to local market prices. Information about prices were obtained from the commune agricultural offices, from local markets or from the farmers themselves. Some income activities are officially illegal, such as logging in conservation forest land, and may therefore be underreported in the survey.

Incomes from timber and fuelwood were registered based on the past 12 months' extraction of such products. Forest income could in theory also have included revenues in the form of tree growth per ha per year. The scope of the study, however, did not allow us to include this aspect. The chosen alternative is to view forest growth as the building up of household forest capital, which eventually will be harvested and registered as household income.

Estimating income from forest landscapes is a key component of the study. A simple definition of (forest) environmental income is "income earned from wild or uncultivated natural resources" (Sjaastad et al. 2005: 40). These are denominated non-timber-forest-products (NTFP) in this study. We do not distinguish between 'wild' and 'cultivated' trees in the registration of fuelwood and timber. In addition, households cultivate substantial amounts of agricultural crops inside plantation forest lands, including maize, cassava, tea and edible canna. In the study, we wanted to explore the multiple values that forest plantation landscapes have in household economies, beyond the value of conventional forestry products. We therefore distinguished agricultural incomes from forest lands from those from lands primarily designated for agriculture.

The main statistical analyses applied were multiple regression analyses and descriptive statistics. We consider household incomes to be a function of various socio-economic assets and variables such as location, household size, age, labor, gender, education, access to land,

social capital, and other assets. Household size is given by the number of household members; access to labor by the number of household members aged 15-60; education level by the years of schooling of household head; social capital by number of days of collective work; access to land by ha of agriculture and cultivated forest land; other assets households possess include livestock, housing, infrastructure, furniture, vehicles, cash, etc.

From a LF perspective we assume that different socio-economic factors have implications for how forest land is used in households' livelihood strategies. Based on previous studies and narrative information, we assume for instance that access to lowland paddy rice fields and ethnicity affect how forestlands are used to generate income. It could also be linked to other factors such as labor, education level, ethnicity, life cycle (age composition), and access to off-farm income sources. In order to look at various factors influencing the role of forest land in household livelihoods, we ran a nominal regression analysis that was used to test the links between forest cultivating households (FCH) and the non-cultivating ones (non-FCH). We also carried out OLS analyses of forest land income and the size of cultivated forest land against various socio-economic assets of the households. Households were also grouped in three equal-sized groups based on the registered past 12 months of income. Based on this, households were categorized as 'poor', 'medium' or 'less poor'. Ordinal logistic regression analyses were applied to test the relationship between income groups and various factors, including access to various land types. We also looked at differences between locations (villages), in order to investigate possible contextual factors in livelihood adaptations to forest land use.

4 Results

In this section we focus on what factors influence various uses of forestland. We start by mapping how different income groups generate income from forest land, and the relative importance of different income sources in different households. We look in particular at the factors that influence households' decisions to cultivate forest lands, in addition to the levels of income and area of forestland agricultural production. Finally we reflect upon how – and to what extent - contextual factors may contribute to explaining production patterns in the various localities. First, however, we present some basic characteristics of the households in our sample.

4.1 Basic sample characteristics

The mean household size was 4.2, and average age of household head 43.5 years. The average level of education of household heads was about 7 years (Table 2). Household assets and resources relate mainly to land, livestock, housing, cash, and other physical assets, such as motorbikes, TVs and radios. The mean area of cultivated land is small across households (0.57 ha). Households in the communities would normally have 1 or 2 areas of certified lowland agricultural land at their disposal. The maximum size was 1.7 ha, and the minimum 0.08 ha. These areas are typically used for paddy and some maize production. The average size of certified (production) forest area households possess was about 4.5 ha. The mean size of cultivated forest land within these fields was 0.21 ha (ranging from 0 - 0.93 ha).

People in the area are poor. Mean net annual income was found to be slightly less than 39 mill VND (1,950 USD or USD 1.2 /cap and day), with a maximum of 292.3 million and minimum 4.8 million VND. Income differences are slightly above the national average. The Gini coefficient was found to be 0.46 compared to the national average of 0.39.

The main income source is off-farm activities (49.6%). These are mostly related to paid work and business activities of various kinds, often related to the processing of agricultural products such as tea or wine production. Agriculture constituted on average 30.7%, livestock 9.4%, and forest related 9.9 % of the total net income. The results demonstrated that production forest lands were not only important in terms of forestry and the collection of NTFP, but constitute also key areas for agricultural production. Mean net agricultural income from forest land was about 4 million VND, or about 10% of the average net income. Income sizes from agriculture on production forest land were on average higher than those related to logging, fuelwood and non-timber forest products collection. On average such lands constitute about 37% of the total productive agricultural land in the area, and contributes on average about 29% of the average net agricultural income. If all forest related income is added more than 20% of total net household income is generated from forest lands.

Table 2
Main characteristics of households, My Phuong and and Quang Phong Communes, Bac Kan Province, Vietnam, 2014 (N=100)

Variable	Mean	Min	Max	Std Err
Size of household	4.22	2	8	0.122
Age household head	43.52	25	79	1.184
Years of education household head	7.13	0	12	0.266
Days of collective work	5.5	0	30	0.547
Total cultivated area (ha)	0.57	0.08	1.70	0.030
Total classified agricultural land (ha)	0.36	0.05	1.4	0.025
Forestland (ha)	4.54	0	37.2	0.595
Total area of cultivated forest land (ha)	0.21	0	0.93	0.024
Distance to nearest forest land (km)	1.03	0.02	5.00	0.103
Total value assets (1000 VND)	155383	11800	1148800	16657
Total income (1000 VND)	38865	4800	292329	4272
-Off farm income (1000 VND) (%)	19283 (49.6)	0	260000	3833
-Net agricultural income (1000 VND) (%)	11942 (30.7)	200	51400	826
-Net livestock income (1000 VND) (%)	3652 (9.4)	-16000	47400	772
-Net forest related income (1000 VND) (%)	3839 (9.9)	0	33000	493

USD1 = VND 21000

To study the relative productivity and profitability of the various land use activities, we estimated the production and net income (gross margins) per hectare for different competing activities. We found that cassava production gave the highest net returns of all crops per hectare, followed by rice and maize (Table 3). Forestry related and the extraction of NTFP were the least profitable. Importantly, family and other labor costs were not included in the calculations of the gross margin. In addition, except for rice and to a certain extent maize (the share produced on certified agricultural lands), most of these crops and forestry activities were carried out in mixes within the same land plots.

Table 3
Productivity per crops and activities, My Phuong and Quang Phong communes, Bac Kan Province, Vietnam (N=100)

Activities	Number of households (N)	Mean net income per ha (1000 VND)
Rice	100	22953
Maize	54	18138
Cassava	23	24880
Tea	32	22493
Edible canna	18	15745
Timber and fuelwood	93	4968
NTFP	12	697

USD1=VND21000

4.2 The role of forest lands in household economies

In order to investigate how different segments of the population generate income and use forest and other productive lands differently, we ran an Ordinal Regression Analysis of the different income groups ('poor', 'medium', 'less poor') against the various socio-economic characteristics. The results are summarized in Table 4 (N=100; $\chi^2=70.38$; $p<0.0001$). We found that the size of cultivated forest land correlated slightly negatively with income groups, i.e. the

‘less poor’ cultivated smaller areas of forest than the ‘poor’ and ‘medium’ ones. The ‘less poor’ on average had access to significantly more certified agricultural land, and the ‘poor’ and ‘medium’ cultivated more forest land than the wealthiest. The most determinant factors for income levels were, however, found to be the total value of assets (defined as all physical resources, including housing, cash and savings, livestock, radio, TV, etc., except from land) and age of household head. Level of education, and access to labor and certified agricultural land also correlated positively with level of income group. Collective work (defined as number of days of collective work per household) was significantly more important for the ‘poor’ households.

Table 4
Ordinal logistic regression of household socio-economic characteristics by income groups, 2014, Bac Kan Province, Vietnam (N=100)

Variables	Poor	Medium	Less Poor	χ^2	p-value
Total net income (1000 VND)	11765.11	25913.01	79265.84		
Village (dummy village (1) % of total)	10	7	5	2.7608	0.4300
Ethnicity (Dummy group's (1=Dao) % of total)	10	9	5	1.6607	0.6457
Gender (dummy (female) % of total)	4	4	2	1.2608	0.2615
Size of household (no of members)	3.79	3.94	4.94	1.7121	0.1907
Age household head	37.82 ^b	44.62 ^a	48.09 ^a	8.8134	0.0030***
Adult labor	2.24 ^b	2.53 ^b	3.61 ^a	5.9225	0.0149**
Years of education household head	7.30 ^{ab}	6.35 ^b	7.76 ^a	3.6940	0.0546*
Total number of days of collective work	7.00	5.15	4.41	4.6418	0.0312**
Total value assets (1000 VND)	87612 ^b	120564 ^b	259028 ^a	7.3163	0.0068***
Total classified agricultural land (Ha)	0.23 ^c	0.36 ^b	0.48 ^a	3.0027	0.0831*
Total area of cultivated forest (Ha)	0.22	0.24	0.17	2.9553	0.0856*
Forest Land (ha)	3.24	5.23	5.12	0.6914	0.4057
Distance to nearest forest (km)	1.24	1.13	0.72	0.0000	0.9923
Ha forest planted	0.91	1.22	1.69	0.0000	0.9969
Total	33	34	33		

$\chi^2=70.38$; $p<0.0001$; p-values correlation estimates: *** is significant at $p<0.01$; ** is significant at $p<0.05$; * is significant at $p<0.1$

a,b,c, Bonferroni test; groups with different letters are significantly different from each other ($p<0.05$).

USD1 = VND 210000

Comparing income sources of the various income groups demonstrated that the ‘less poor’ generate significantly more income from forest related activities than the ‘medium’ and the ‘poor’ (Table 5). This counts especially for ‘fuelwood’ and ‘poles and timber’. For NTFP, the differences between the income groups are less pronounced. While there were insignificant differences between households in terms of plantation investments (area of forest planted), it was only the ‘less poor’ who were able to generate any substantial income from these investments in terms of logging revenues. The interviews with farmers also confirmed forestry

and logging being perceived as economically marginal activities. Farmers often work together in groups, cutting small amounts of 5-10 m³ of timber. With a price per m³ of 500-600,000 VND, the economic returns of such small-scale activities are limited.

Production forest land is an important resource in terms of generating agricultural income (Table 5). While the ‘poor’ generate on average 2.47 million VND, the ‘medium’ generate about 4.25 and the ‘less poor’ 3.47 million VND, but the differences here were not statistically significant. The differences in income levels from agricultural activities on forest land between income groups, were not found to be statistically significant. The same counts for the share of forest agricultural income of the net total agricultural income.

Table 5
Differences between income groups and forestland incomes, Bac Kan Province, Vietnam, 2014 (N=100)

Variable	Poor (N=33)	Medium (N=34)	Less poor (N=33)	p-value
Net forest related income (1000 VND)	2425 ^b	2778 ^b	6347 ^a	<0.0001***
- Net income NTFP (1000 VND)	258	179	585	0.3014
- Fuelwood subsistence income (1000 VND)	1970 ^b	2227 ^{ab}	3004 ^a	0.0170**
- Net income poles and timber (1000 VND)	197 ^b	372 ^b	2758 ^a	0.0027**
Net agricultural income from forest land (1000 VND)	2474	4254	3466	0.3802
Relative agricultural income from forest land (%)	34.5	30.1	30.0	0.5662
Share of agricultural income from forest land of total net income (%)	25.1 ^a	17.7 ^a	7.0 ^b	0.0003

p-values estimate significance for differences between household categories : *** is significant at p<0.01; ** is significant at p<0.05; * is significant at p<0.1

a,b,c, Bonferroni test; groups with different letters are significantly different from each other (p<0.05).

USD1 = VND 210000

In order to investigate factors influencing whether households cultivate on forestland or not, we categorized households into forest agriculture (FA) and non-forest agriculture (non-FA) households and carried out a nominal logistic regression by various socio-economic factors (Table 6). The findings indicated a negative correlation between forest agriculture and the distance to the forest land and off-farm income. In other words, the further away households had their forest land, the less likely they were to cultivate this land. And similarly, the higher off farm income levels, the less likely to grow crops on forest lands.

There was also a weak positive correlation between forest cultivation, ethnicity and age, implying that the ethnic minority group Dao households and the older composite households were more likely to cultivate forestland. There were also significant differences between villages in terms of forest cultivation. Households in Village 3 cultivated less than Village 4 (dummy), while Village 2 produced more frequently. Surprisingly, and contrary to what could

be expected, the results here did not demonstrate significant correlations between access to certified lowland paddy land and households' frequency of forestland cultivation.

Table 6
Nominal logistic fit of household socio-economic characteristics against forest agriculture (FA) and non-forest agriculture (non-FA), 2014, Bac Kan Province, Vietnam (N=100)

Variables	FA (N=60)	non-FA (N=40)	χ^2	p-value
Village (dummy village % of total) (dummy = Village 1)	19 %	3 %	21.456	<0.0001***
Ethnicity (Dummy group's % of total) (dummy = Dao)	20 %	4 %	6.802	0.0785*
Gender (dummy % of total) (dummy = female headed household)	6 %	4 %	0.025	0.8700
Size of household (no of members)	4.28	4.13	0.142	0.7067
Age household head	44.32	42.33	2.887	0.0893*
Adult labor	2.87	2.68	1.117	0.2905
Years of education household head	6.77	7.68	0.308	0.5790
Total value assets (1000 VND)	138816.75	180232.65	0.003	0.9587
Off farm income (1000 VND)	17628.73	21765.05	5.992	0.0144**
Total classified agricultural land (Ha)	0.29	0.46	1.270	0.2597
Forest Land (ha)	5.13	3.64	0.266	0.6058
Distance to nearest forest (km)	0.94	1.16	6.699	0.0096***

$\chi^2=73.33$; $p<0.0001$; p-values estimate significance for differences between household categories : *** is significant at $p<0.01$; ** is significant at $p<0.05$; * is significant at $p<0.1$. USD1 = VND21000.

The OLS (N=100; $R^2=0.4726$; $F=5.0175$; $P<0,0001$) between forest agricultural income levels and socio-economic characteristics demonstrated few significant correlations (Table 7). There were only significant correlations between forest agricultural income and location. In addition, we found a weak positive correlation between the age of household heads and forest agricultural income. The same was found when running an OLS of area of forest agriculture land by socio-economic factors (N=100; $R^2=0.5594$; $F=5.3366$; $P<0.0001$) (table not included). This also demonstrated a negative correlation between the area of cultivated forest and off-farm income, as we also found in the Ordinal Regression of income groups.

Table 7
Ordinary Least Square Analyses of forest agriculture income (1000 VND) against socio-economic characteristics, Bac Kan Province, Vietnam, 2014

Variables	Estimate	Std Error	t Ratio	Prob> t
Intercept	-3335.48	2895.13	-1.15	0.2525
Village 1	296.34	2100.62	0.14	0.8882
Village 2	3770.27	1128.58	3.34	0.0012***
Village 3	-2249.03	932.37	-2.41	0.0180**
Ethnicity 1	1587.08	2156.63	0.74	0.4638
Ethnicity 2	866.41	1215.54	0.71	0.4780
Ethnicity 3	-1499.24	1777.50	-0.84	0.4014
Size of household (no of members)	585.21	401.10	1.46	0.1483
Sex household head	266.18	642.32	0.41	0.6796
Age household head	73.44	37.94	1.94	0.0563*
Adult labor	-47.11	415.74	-0.11	0.9100
Years of education household head	159.65	155.93	1.02	0.3088
Total number of days of collective work	33.72	70.54	0.48	0.6339
Total value assets (1000 VND)	0	0	-1.19	0.2367
Total classified agricultural land (Ha)	-1636.45	2157.33	-0.76	0.4502
Distance to nearest forest (km)	-287.51	364.07	-0.79	0.4319

N=100; R²=0.4726; F=5.0175; P<0.0001; p-values estimate significance for differences between household categories : *** is significant at p<0.01; ** is significant at p<0.05; * is significant at p<0.1

USD1 = VND21000

In summary, forest agricultural income sums are substantial, particularly for the ‘medium’ and the ‘poor’ households. While the ‘less poor’ in absolute terms generate more from most income sources, the income differences are less pronounced between wealth groups in terms of forest agricultural income. For the ‘poor’, forest agricultural income constitute about 46% of the total income, and the share of agricultural amounts of income is higher than from the other forest related income sources. Off-farm income levels and location seem to be the most decisive factors for forest land agricultural income. Surprisingly and in contrast to other studies in the area, we did not find a significant correlation between access to paddy-land and forest agricultural income. These studies were carried out some years ago, and the discrepancies in results might be attributable to a trend towards preferences of paid work instead of subsistence agriculture amongst households. It may also be explained by the agro-ecological and institutional context of the specific locations of this study, since such factors seem to a great extent to vary between locations in the northeastern Vietnam (Sadoulet et al. 2002).

4.3 Livelihoods, land use and location

There were major differences in the use of forestland between the communes and villages. We compared land use and income sources for the respective villages. The results are summarized

in Table 8. The villages in Quang Phong have access to significantly more certified agricultural land than the My Phuong villages. In My Phuong, the average forest agricultural income is higher than that from certified agricultural land, likely attributable to the smaller areas available for lowland rice production here. Village 1 produces more cassava than the other villages. This adaptation could be due to the agro-ecological conditions of the hillsides here, likely in combination with the more wide use of cassava amongst the Dao who inhabit Village 1. A rotational mode of cassava production is widespread amongst households here, often in combination with the tree plantations. Once the tree plantations have been cleared, cassava production can be carried out for a few years before the trees grow too big. This is an important income source for many households, either as food, animal feed or for wine production. Commercial tea production is most important in Village 2. Here, a distinct environment for tea production and trade has developed. Closeness to roads and markets may be explanatory factors for this, in combination with ‘random’ events of some individuals captivating interest in this business. Edible canna and maize are the predominant forest crops in the Quang Phong. Edible canna is used in commercial noodle production, and hence, this is also for households’ cash income. Forestry activities (incomes from poles and timber) are slightly more important in Quang Phong, likely explained by Quang Phong’s relative proximity to several local plywood factories. In Village 4, there was also a local furniture factory owned by one of the households in the village. Income from NTFP is predominant in the Village 1, likely attributed to the Dao peoples’ long history of proximity to forests and the use of forest products.²

Comparing the villages indicates that places have their distinct adaptations to the use of forest land. Location-specific factors of social institutions and knowledge, business cultures and networks may explain these differences. The complexity of adaptations cannot easily be boiled down to one single explanatory factor, but is rather caused by a mix of agro-ecological, economic, market, social and environmental factors.

² ‘Dao’ literally means ‘people of the forest’ in in the local language (Castella et al. 2002).

Table 8
Location, incomes production forest land use and livelihood outcomes, My Phuong and Quang Phong
Communes, Bac Kan Province, Vietnam, 2014 (N=100)

Variables	Village 1	Village 2	Village 3	Village 4	p-value
Total cultivated area (ha)	0.53 ^{ab}	0.66 ^a	0.45 ^b	0.63 ^a	0.0296**
Total classified agricultural land (ha)	0.26 ^c	0.23 ^c	0.40 ^b	0.56 ^a	<0.0001***
Total area of cultivated forest (ha)	0.27 ^b	0.43 ^a	0.05 ^c	0.07 ^c	<0.0001***
Area forest planted (ha)	1.81 ^a	0.49 ^b	1.17 ^a	1.78 ^a	<0.0001***
Forest Land (ha)	10.18 ^a	1.32 ^c	2.68 ^{bc}	5.04 ^c	<0.0001***
Average distance to forest land (km)	1.62 ^a	0.88 ^b	1.01 ^{ab}	0.69 ^b	0.0458**
Net forest related income (1000 VND)	3489.55	2574.14	4926.65	4474.74	0.1958
– Net income poles and timber (1000 VND)	449.55	365.00	1768.00	1833.60	0.3220
– Fuelwood subsistence income (1000 VND)	1903.63	2209.14	2883.65	2561.14	0.2508
– Non-timber-forest products (1000 VND)	1136.36 ^a	0 ^b	275.00 ^b	80.00 ^b	0.0023***
Net total agricultural income (1000 VND)	8989.51 ^b	13670.12 ^a	10152.81 ^{ab}	14392.38 ^b	0.0351**
Net agricultural income from forest land(1000 VND)	4328.78 ^b	7285.12 ^a	1638.62 ^c	2452.86 ^c	<0.0001***
– Tea (1000 VND)	496.05	6386.73	61.20	27.00	
– Cassava (1000 VND)	3591.82	898.39	45.00	0	
– Edible canna (1000 VND)	0	0	715.62	244.00	
– Maize (1000 VND)	240.91	0	816.80	2181.86	
N	22	28	25	25	

p-values estimate significance for differences between villages : *** is significant at $p<0.01$; ** is significant at $p<0.05$; * is significant at $p<0.1$.

a,b,c,d Bonferroni test; groups with different letters are significantly different from each other ($p<0.05$).

USD1 = VND 210000

5 Discussion and conclusions

In Vietnam, as in many other countries, a narrow forest-agricultural dichotomy focus in forest and land-use planning policies tend to mask the complexity of potentials, uses and the role of forest lands in household economies and beyond. This study underscores that incomes from plantations and forestry activities are limited in household economies, especially for the poorest segments of households. The findings also indicate that production forest land predominantly associated with plantation forests and forestry activities, may be more important in household livelihood adaptation strategies than is often assumed both in research and in policy discourses. In the study area, livelihood activities on forest land are not limited to conventional forestry, but consist of a variety of activities of key importance for household livelihoods. The livelihood activities and outcomes vary substantially between households and locations, indicating that the one-size-fits all policies of devolution of forest land rights and promulgation of small-scale plantation forests have spurred multiple livelihood responses (Castella and Dang 2002). The

study has estimated the relative importance of the various uses of such landscapes in household livelihoods.

The production forest lands seem to be particularly important for the poorest segments of households, and more so in communities where access to certified agricultural lands is limited. Households exploit productive forest landscapes within a continuum, where conventional forestry is carried out alongside agriculture and timber and non-timber forest extraction activities. The different patterns of land use represent different local adaptations to reforestation and forest land distribution policies carried out in different parts of Vietnam over the past 20-30 years. Unclear rules and regulations on the use of production forest lands, in combination with the relative freedom for adapting and negotiating policies with local people of the district and commune authorities (Kerkvliet 2005, Clement and Amezaga 2009), have caused multiple adaptations in the use of such lands (Sadoulet et al. 2002). More recent policy regulations, e.g. outlined in the 2006 Decision 186/2006/TTg allow for up to 40% agroforestry activities within protection forest land (SRV 2006). Nevertheless, the specifications of what kinds of activities this might entail are still unspecific and open for local and individual interpretations. These policies' encounter with complex existing institutional and agro-ecological conditions, have led to multiple livelihood adaptations and a variety of land uses between households and locations. This has resulted in landscape mixes of forest plantations, 'natural' forests, agroforestry, and agriculture. Consequently, such landscapes become highly diverse, with unclear borders and distinctions between agricultural lands, plantations and natural forests.

The findings may have important implications for how forest policies are being planned and implemented in practice. When estimating the opportunity costs of policies aiming at changing land use practices and limiting the use of productive forest lands, one needs to avoid broad-sweeping assumptions about local land uses. Even though the scope of this study did not allow for detailed studies of the impacts that various land use adaptations have on the ecological integrity in the respective locations, it is obvious that the land uses also have different implications for both biodiversity and the carbon contents of landscapes. Hoang et al. (2010) have estimated that in the Vietnam context carbon contents would range between 175 tons for 'natural forests' to about 33 tons carbon per hectare for 'plantation forests'. Converted into CO₂ equivalents and with a price per tons of CO₂ at 5 USD, this would equal standing values of such forests of 3167.5 USD (66.5 mill VND) for 'natural' and 597.3 USD (12.5 mill VND) for 'plantations'. These simple calculations indicate that compensations for conserving 'natural

forests' (i.e. REDD+) would be competitive relative to all of the livelihood activities in the study area (as per outlined in Table 3), while 'poor' and 'plantation' forests are only competitive relative to the productive values of logging and the extraction of fuelwood and NTFP. Nevertheless, considering these activities in isolation from each other in this way is highly problematic, as mixes of land uses are found within the same plots. Such mixes of productive activities might also prove to be more beneficial and sustainable in terms of generating both livelihoods and environmental values. A scenario study carried out by ICRAF in Bac Kan comparing various land uses, including forest plantations, crops, REDD+ and REALU (agroforestry), found REALU to be the preferred option in terms of balancing economic and carbon benefits (Bernard et al. 2013). Mono-cultivation of exotic tree species and crops ('pure' agriculture) were the least desirable.

In order to develop sustainable climate mitigation and adaptation policies, it is crucial to take the different productive values and uses of forest landscapes into account. Contextual knowledge about the value of livelihood activities in productive plantation forest landscapes is warranted in all policy planning and implementation, including in REDD+. It is important that especially poor households are secured access to the products and incomes that they currently have, and that future compensations reflect all land uses and activities carried out within such landscapes (Mertz et al. 2012).

Innovative forest management efforts to enhance forest carbon stocks, for example through REDD+ and REALU, should not imply a one-size-fits-all policies, but rather aim at developing context-specific approaches to incentivize households to increase landscape values both in terms of environmental integrity and more sustainable household incomes. Achieving such objectives would demand transformational changes in policies, institutional arrangements and funding mechanisms (Harvey et al. 2014). Considering the multiple uses of forest landscapes, the case calls for moving out of sectorial 'silos' towards inter-sectorial policy convergence in the planning and implementation of sustainable landscape policies. Nevertheless, more knowledge is needed in order to understand the variety of land use options and scenario models that could be viable for the sustainable use of forest-agricultural landscapes. Balancing the multiple functions of forest landscapes, including environmental, social and economic concerns, more efficiently becomes paramount. In order to do so there is a need to move beyond the forest-agriculture dichotomy targeting objectives of both adaptation and mitigation through

multi-stakeholder planning processes, where the interests of all actors are taken into account (Scherr, Shames, and Friedman 2012).

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Annex 1: Survey questionnaire

Tasks for getting interview underway:

- State that the survey is part of a study on land management, understanding local practices of agriculture and forest management
- Explain the guaranties of anonymity and confidentiality, and distinctiveness from proponent.
- Summarize parts of interview: Basic HH information; assets; income; land use and land management; forest use and management; explain that we want to measure size of land on site.
- Ask for consent to perform the interview

Date:

Time from: To:

Village code:

Household code:

GPS reference:

Distance to nearest market (km/minutes walk):

Ethnic group:

Religion:

Context of interview (With whom, how many participating, etc.):

1. Basic Household Information:

1.1. Household composition and characteristics

HH members	Sex (m/f)	Relationship to HHH ¹	Age	Years of Education
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

¹Relationship: 1=HHH, 2=spouse, 3=child, 4=son/daughter in law, 6=grandchild, 7=dependant, 8=labourer, 9=other, specify:

1.2 How long have you lived in this area (number of years)?

1.3 Where have you been living before you moved here?

1.4 What was the reason for moving here?

Codes: 1=availability of land, 2=employment, 3=family, marriage, 4=conflicts, 5=moved by government, 6=others, (specify):

2. Livestock ownership and exchange

2.1 Livestock last 12 months

Animal type	# 12 months ago	Total value	Sold live animal, and at what price?	Died	Slaughtered	Born	Given out	Bought	Received	# now	Total value now
Cows											
Bulls											
Calves											
Buffalo											
Horse											
Pigs											
Chicken											
Duck											
Fish (ponds)											
Others:											

2.2 What were the inputs associated with livestock ownership during the past 12 months?

Type of input	Total cost of input
Vet service	
Fodder from: <ul style="list-style-type: none"> - purchase - from agricultural land - forest - other natural environments 	(for purchase only here, but state % from the other as well)

Tax (sale)	
Labor (employed)	
Others	

2.3 Income from Animal Products

2.3.1 Meat production from cattle last 12 months:

	Season/Period	# of cattle slaughtered	% of meat sold	Price of one animal	Total cash income from meat sales
1					
2					
3					
4					

2.3.2 Milk production from cows last 12 months:

Season	Period	# of milk cows	Production litres/day	% of milk sold	Price (mean) in VND/litre
1					
2					
3					
4					

2.3.3 Other livestock income last 12 months:

Type	Total # produced	Total # sold	Price per unit (VND)	Total cash income (VND)
Butter				
Eggs				
Hides				
Other				

2.4 How much fish did your household catch in the streams, rivers and small lakes of the forest both for own use and sale **on average per week over the last year?**

No	Main fish species (common names)	Own use (kg)	For sale (kg)	Unit price (VND/kg)
1				
2				
3				

3. Social assets/capital

3.1 Do you participate in any cooperative or other groups?

Name of the group	Main responsibilities	Membership fees (VND)

3.2 Do you organize any type of work together with other households in the village (e.g. irrigation, other farm work, forest protection, etc.)?

Type of work ¹⁾	Number of days work per year per household

1)

2) Codes: 1=irrigation; 2=general farming; 3=construction/maintenance of buildings; 4=forest protection
5=others (specify):

4. General household assets and savings

3.3 Land

a)	How many plots of land do you currently cultivate?	
b)	Do you have access to (fields of) land that you don't cultivate anymore (are fallowed)? If yes, how many?	
c)	How many plots of land do you have access to outside of the village/commune (e.g. ancestral lands, etc.)?	

4.2 Dwelling

Type	Number	Value
Buildings or structure locally		
Buildings or structures elsewhere		

4.3 Do you own machinery or other major assets, such as cars, motorcycles, bicycles, TVs, mobile phones or radios? If yes, fill out:

Type of asset	Number of units	Total current value
Motorcycle		
Bicycle		
Mobile phone		
TV		
PC		

Radio		
Cassette/CD/ VHS/VCD/DVD/ player		
Stove for cooking (gas or electric only)		
Refrigerator/freezer		
Chainsaw		
Plough		
Wheelbarrow		
Furniture		
Water pump		
Solar panel		
Brush cutter		
Rice boiler		
Tractor		
Car/truck		
Others (specify):		

4.4 Financial Assets and Debt

Type	Value
Bank account	
Cash	
Gold/jewelry	
Debt	
Others (specify):	

4.5 If debt, how much interest rate did you pay last 12 months (VND)?

5. Other income

5.1 Has any member of the household had paid work over **the last year**?

Note: One person can be listed more than once for different jobs. Ask specifically about selling of household labor, as this is mentioned to be the main source of income for many households in other reports.

Household member	Type of work ¹	Days worked past year	Daily wage rate	Total wage

1) Codes: 1=agriculture; 2=construction work; 3=carpenter; 4=restaurant; 5=shop; 6=teacher; 7=administration/accountant; 8=taxi driver (car or motorbike); 9=others (specify):

5.2 Are you or any other member(s) of the household involved in any type of business, and if so, what is the **net income** related to that business **on average per week last year**?

	Business 1	Business 2	Business 3
1. Type of business ¹⁾			
2. Net income (in VND)			

1) Codes: 1=shop/trade; 2=agricultural processing; 3=handicraft; 4=carpentry; 5=transport (car, boat, etc.); 6=lodging/restaurant; 7=wine production/selling; 8=brick making; 9=herbalist/traditional healer; 10=tourism; 11=construction work; 12=Other (specify)

5.3 What is the average income received from income transfers (state support; remittances etc.) the household members together received last year (in VND):

	Amount
State support	
Remittances	
Others:	

6. Forest resources and management

6.1 How many fields of forests do you have access/user rights/ownership to?

6.2 How far is it from the house/household to the nearest forest that you use (km/time walking)?

6.3 Income from forests: What is the importance of the following forest products that the members of your household have collected **on average per week over the last year**?

	Main forest products	Collected where	Collected by whom	Own use	For sale	Unit	Market price	Total value (price* production)
		Forest type ¹⁾	Labour ²⁾					
1	Fuelwood							
2	Poles & timber							
3	Charcoal							
4	Rubber							
5	Bamboo							

6	Rattan							
7	Medicinal plants							
8	Wild fruits and leaves							
9	Mushroom							
10	Nuts							
11	Bush meat							
12	Fodder							
13	Others (specify):							

When coding, use the number for the dominant category. Hence, if one category clearly dominates, do not use 'mix'/'both'.

- 1) Codes: 1= primary forest; 2= secondary forest; 3= mix; 4 = plantation
- 2) Codes: 1= HHH; 2=spouse; 3=children; 4=other (specify):

6.4 Have you received any type of support for conserving forest land the last year? If yes, what type of support and how much have you received?

Type of scheme	Amount
PFES	
Protection contract	
Others (specify):	

6.5 If part of the PFES or forest protection, how have you invested the money that you received?

Type of investment	Amount
Agricultural inputs	
Bank account	
Medicine	
Livestock	
Food	
Others (specify):	

6.6 If you receive money through contract (PFES or protection), how big is the area that you have responsibility to protect? ha

6.7 If you receive money through contract (PFES or protection), have you been explained why the government is providing you with this money? If yes, what are the reasons?

Codes: 1=Yes; 2=No

.....

6.8 Have there been any challenges with the PFES for you and/or others in the village (**ask all this question, even though they don't receive money from PFES or other schemes**)? If yes, what were these?

6.9 What's your view about the value of protecting forest?

I will present 8 statements for you, and I would kindly ask you to say whether you agree or not on a scale on 1-5, where 1 means that you don't agree at all, and 5 means that you strongly agree.

No	Response	Scale 1-5
1	Forest protection is important	
2	Forest protection increases long-term stock of forests resources	
3	Forest protection makes us receive compensation for reduced use	
4	Forest protection makes us secure access to income from tourists	
5	Forest protection excludes villagers from using the forest for basic needs	
6	The household doesn't get enough compensation for income losses caused by forest protection	
7	Forest protection restricts the household's access to farmland	
8	Forest protection restricts the household's access to benefits from tourists	

6.10 If your household should increase the agricultural production, what would be the most likely way of doing that?
Codes: 1=clearing of new land (forest); 2=increase investments on the current land; 3=buy more land; 4=rent more land; 5=others (specify):

6.11 Are you aware of the role forests play in climate change?
Codes: 1=Yes; 2=No

6.12 If 'yes', what relationships between deforestation and climate change do you find especially important? _____



Questionnaire for land plots

PLOT 1:

A. Background

1.	Size of plot (ha) (measure or use red book information)	
2.	GPS reference	
3.	Distance from house (measured by time walking from house/or km measured by GPS)	
4.	When did you acquire the plot (year)?	
5.	How did you acquire the plot? <i>Codes: 1=inherited; 2=provided by government; 3=bought; 4=cleared on own initiative; 5=others (specify):</i>	

B. Tenure

1.	Type of ownership (tenure) <i>Codes: 1= certificate; 2= no-certificate (state) ; 3=common property; 4= rented 5=others (specify):</i>	
2.	If rented, who are you renting it from? <i>Codes: 1= state; 2= other households; 3=companies (SFE, private); 4=others (specify):</i>	
3.	If inherited, who did you share land with? <i>Codes: 1=brother/sister; 2=other family members (specify): 3=others (specify):</i>	
4.	If you have Red Certificate for the land, when and how did you acquire this (year)?	
5.	If you don't have Red Certificate for the land, what prevents you from accessing it? <i>Codes: 1=too expensive; 2=takes too much time; 3=others (specify):</i>	

C. Transfer of land (for uncertified land only, mainstreamed rights for certified)

1.	Are you allowed to sell the plot? <i>Codes: 1=Yes; 2=No</i>	
2.	If yes, to who can you sell it? <i>Codes: 1=anyone; 2=other family members; 3=other villagers; 4=other (specify):</i>	
3.	Are you allowed to lease out the plot? <i>Codes: 1=Yes; 2=No</i>	
4.	If yes, to whom can you lease it to? <i>Codes: 1=anyone; 2=other family members; 3=other villagers; 4=other (specify):</i>	
5.	If yes, for how long can you lease it out? (number of years)	
6.	Are you allowed to give the land to anyone? <i>Codes: 1=Yes; 2=No</i>	
8.	If yes, to whom can you give it to? <i>Codes: 1=anyone; 2=other family members; 3=other villagers; 4=other (specify):</i>	
9.	Are you allowed to bequeath the land? <i>Codes: 1=Yes; 2=No</i>	
10.	If yes, to whom can you bequeath it to? <i>Codes: 1=anyone; 2=other family members; 3=other villagers; 4=other (specify):</i>	

D. Use

1. What type of investments are you currently doing on the field?

Type of investments	Codes: 1=yes; 2=no	Performed by whom? ¹
Putting up fences		
Ploughing/tillage		
Apply fertilizers		
Apply pesticides		
Plant trees (seedlings)		
Irrigation		
Make ditches and ridges		
Terracing		
Others (specify):		

1) Codes: 1=HHH; 2=other household members (specify): ; 3=other villagers; 4=hired labor; 5=others (specify):

2. What type of activities do you currently do on the field?

Type of activities	Codes: 1=yes; 2=no	Performed by whom? ¹
Cultivation of crops		
Cutting trees and bushes		
Burn		
Collect fruits, berries and other wild plants		
Collect branches and other wood		
Collect fodder		
Grazing of animals		
Others (specify):		

1) Codes: 1=HHH; 2=other household members (specify): ; 3=other villagers; 4=hired labor; 5=others (specify):

3. At the time you acquired the field/plot, what type of investments were you allowed to do on the field?

Note: Try to find out whether there has been any change.

Type of investments	Codes: 1=yes; 2=no	Performed by whom? ¹
Putting up fences		
Ploughing/tillage		
Apply fertilizers		
Apply pesticides		
Plant trees (seedlings)		
Irrigation		
Make ditches and ridges		
Terracing		
Others (specify):		

1) Codes: 1=HHH; 2=other household members (specify): ; 3=other villagers; 4=hired labor; 5=others (specify):

4. At the time you acquired the field/plot, what type of activities were you allowed to do on the field?

Note: Try to find out whether there has been any change.

Type of activities	Codes: 1=yes; 2=no	Performed by whom? ¹
Cultivation of crops		
Cutting trees and bushes		
Burn		
Collect fruits, berries and other wild plants		
Collect branches and other wood		
Collect fodder		
Grazing of animals		
Others (specify):		

1) Codes: 1=HHH; 2=other household members (specify); ; 3=other villagers; 4=hired labor; 5=others (specify):

5. What crops did you grow on you this plot the past 12 months?

Crop	Yield (kg)	% sold	Price	Gross value (price* prod)	Share of plot (ha)	Inputs/ tools ¹	Costs of inputs (VND)	Mode of production ²
Annuals:								
Paddy								
Maize								
Cassava								
Sugar cane								
Peanut								
Banana								
Sweet potatoes								
Beans								
Eggplant								
Taro								
Cashew								
Edible Canna								
Perennials:								
Tea								
Persimmon								
Avocado								
Guava								
Eugenia								

1) Codes: 1=hired labor; 2=fertilizer; 3=seeds; 4=pesticides; 5=plough; 6=hoe/stick; 7=tax;

8=other (specify):Irrigation investment and work inputs

2) Codes: 1=long fallow (more than 1 year); 2=annual fallow; 3=multicropping; 4=perennial (e.g. coffee, fruit trees, etc.)

6.	Do you cultivate the entire plot? Codes: 1=Yes; 2=No	
7.	If no, how much of the plot is uncultivated (ha)?	
8.	Have you expanded the cultivated area since you acquired the plot? Codes: 1=Yes; 2=No	

a)	If yes, why did you decide to expand agriculture here? <i>Codes: 1=to increase food production; 2=to increase household income (selling to market); 3=loss of land elsewhere 4=others (specify):</i>	
b)	If no, why have you not expanded the cultivated area of the plot? <i>Codes: 1=I have been using all of it all the time; 2=I have had enough production to sustain the household; 3=I'm not allowed to expand the area; 4=others (specify):</i>	
9.	Have you received any type of government support for expanding your agricultural land? <i>Codes: 1=Yes; 2=No</i>	
a)	If yes, what type of support?	Amount
	Fertilizers	
	Seeds	
	Irrigation	
	Extension services	
	Other (specify):	
b)	If no, what prevents you from receiving support from the government? <i>Codes: 1=the government doesn't offer any support; 2=I have not asked/needed any support; 3=others (specify):</i>	
10.	If you have Red Book certificate to the plot, has this at any time been submitted to the Bank of Social policies or any other banks to acquire loans? <i>Codes: 1=Yes; 2=No</i>	
a)	If yes, when did this take place?	
b)	When did/will you finish repaying the loan (year)?	
c)	If no, why haven't you used this opportunity? <i>Codes: 1=I don't have the capacity to pay back; 2=I'm not qualified for getting loan; 3=don't need it; 4=others (specify):</i>	

PLOT 2:

etc.

Annex 2: List of interviewees

Name	Position	Affiliation
Hanoi:		
Dr. Nguyen Ba Ngai	Deputy Director General	VN Forest/MARD
Dr. Pham Manh Cuong	Former Head/Coordinator	UN REDD Vietnam
Ms. Nguyen Thi Thu Thuy	Deputy National Program Director	UN REDD Vietnam
Mr. Luong Pham Hong	Deputy Director	VNFF
Ms. Huynh Thi Mai	Deputy Director	MONRE
Dr. Phung Van Khoa	Deputy Dean	Forestry University of Vietnam
Dr. Vu Tan Phuong	Senior Researcher	Vietnam Forestry Academy
Dr. To Xuan Phuc	South East Asia Analyst	Forest Trends
Ms. Dang Thuy Nga	PES Development Specialist	Winrock Int.
Mr. Do Trong Hoan	Programme Officer	World Agroforestry Centre (ICRAF)
Dr. Akiko Inoguchi	Forestry Officer	FAO/UN REDD Programme
Ms. Ly Thi Minh Hai	REDD+ Sector Leader	SNV
Mr. Eberhard Goetz	Programme Officer	GTZ
Mr. Eiji Egashira	Programme Officer	JICA
Mr. Ho Manh Tuong	Project Coordinator	FIPI
Lam Dong:		
Mr. Pham Thanh Nam	Field Coordinator in Lam Dong Province	LEAF Project - REDD+ Program, SNV
Mr. Vo Dinh Tho	Director	Lam Dong VNFF
Mr. Le Van Trung	Programme Officer	Lam Dong Department of Forestry
Ms. uang Cong Hua Nam	Director	Lam Dong FPD
Dr. Ngoc Tuan Lam	Head of Faculty of Environmental Sciences	Dalat University
Mr. Ti Ong	Deputy Director	Da Sar Commune PPC
Mr. Vuong Konso Ha	Vice Deputy	Da Nhim Commune Commune PPC
Name unavailable	Vice Deputy	Da Chais Commune PPC
Bac Kan:		
Mr. Duc	Programme Officer	3PAD Bac Kan
Nong Qusi Thuy	Programme Officer	DARD Bac Kan
Luc Van Huan	Land Manager	PPC My Phuong Commune

Nguyen Thi Coang	Agricultural Officer	PPC My Phuong Commune
Nong Van Dung	Agricultural Officer	PPC, Van Minh Commune
Nguyen Van Kiem	Programme Officer	FPD Bac Kan
Vu Manh Nghia	Programme Officer	FPD Bac Kan
Mr. Dam van Chien	Head of Department	Department of Forestry, Bac Kan
Mr. Kin	President of My Phuong Commune	PPC, My Phuong
Name unavailable	Forestry Officer	PPC, Quang Phong
Name unavailable	Commune Head	PPC, Quang Phong
Ms. Ha and Mr. Mau	Programme Officers	UN REDD Office Bac Kan

