

## Linking reforestation with forest policies: A multi-scale and interdisciplinary methodology applied to Vietnam

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### Abstract

A large number of countries have initiated similar sets of policies aiming to increase forest cover. These have usually included large-scale afforestation campaigns and the devolution of land property rights to households. Most of the research works that have analysed the link between state policies and land-use change have hitherto been restricted either to qualitative local level studies or to quantitative macro-scale analyses. The former have offered an in-depth understanding of the drivers for farmers' decisions but their applicability to different local contexts is questionable. The latter have identified general trends and proximate causes for reforestation but often without being able to explicitly separate the effect of a particular policy or to ascertain the causal mechanisms that link policy and land-use change.

Using the Institutional Analysis and Development (IAD) framework as a unifying canvass, our assessment of the impact of forest policies on reforestation in Vietnam investigates several governance levels and uses both quantitative and qualitative approaches. We started from the analysis of farmers' land use decisions at the local level relying on ethnographical methods and institutional analysis. Then, we used these findings to build models of forest cover change, which were tested at the meso-scale level using remotely-sensed data and spatial regression analysis. This quantitative study was complemented by an institutional and political economy approach that explored the underlying drivers for reforestation and policy implementation at the provincial level. Finally, a discursive and political ecology perspective allowed us to analyse the role of the prevailing narratives and beliefs in policy design at the national level.

We discuss in this paper why this multi-level and holistic methodology is particularly effective for identifying the links between policies and forest cover change and for understanding the discrepancies that exist between policy intentions and observed outcomes. Lastly, we argue that this approach is also particularly well suited for designing and effectively disseminating appropriate policy recommendations.

**Keywords:** *Interdisciplinarity; multi-scale; methodology; IAD framework; forest policy; reforestation; Vietnam*

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## I. Introduction

### I.1 Context

The governments of many developing countries (e.g. Brazil, Chile, China, India, Philippines and Vietnam) have initiated large afforestation campaigns with the support of multilateral and bilateral donors. At the same time, there has been an increasing recognition of the importance of the institutions governing access and use of forest and land and similar institutional reforms, including land classification, privatisation and decentralisation<sup>4</sup> of land and forest management, have been initiated with the aim of supporting forest rehabilitation efforts.

State-led afforestation programmes might lead to extensive land-use and cover change (LUCC). Recent state plans for afforestation concern 8.6 million hectares (ha) in China (Weyerhaeuser *et al.*, 2005), 1.4 million ha in the Philippines (Chokkalingam *et al.*, 2006), and 5 million ha in Vietnam (De Jong *et al.*, 2006). The 1988 National Forest Policy of India plans bringing at least one-third of the country area under forest cover (Balooni and Singh, 2007). Despite of the potential significant environmental and social impacts associated with LUCC in these countries, the actual impact of forest policies on land use and management in developing countries has received little attention in the literature (Rudel, In Press, Corrected Proof).

Vietnam provides a remarkable case study in this respect. Its government has implemented since the early 1990s a series of state initiatives aiming to increase forest cover and protect existing forest. These programmes have been articulated around three main tenets: stopping shifting cultivation, devolving forest management to households and planting trees through reforestation campaigns. To the eyes of an outsider, these policies appear to be relatively successful (Mather, 2007). With a significant rise in forest cover from 28 per cent in 1990 (Prime Minister of the Government of Vietnam, 2007) to 38 per cent in 2006 (GSO, 2006), Vietnam stands out in the last Global Forest Resources Assessment as one of the few countries in the world where forest cover has increased more than 0.5 per cent per year between 2000 and 2005 (FAO, 2005).

Our project aimed to investigate whether recent state afforestation initiatives have been a success story in the Northern Mountain Region (NMR) of Vietnam (Figure 1) by analysing the impact of two sets of policies: the current national state-led reforestation programme, the Five Million Hectares Reforestation Programme, 5MHRP, and the allocation of land property rights to households and communities.

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<sup>4</sup> These decentralisation policies have taken various forms, e.g. co-management, fiscal, administrative or political decentralisation (cf. Dupar and Badenoch, 2002; Ribot *et al.*, 2006)



**Figure 1. Administrative map of the NMR of Vietnam (provinces in pink colour)**

These two sets of policies are particularly important in Vietnam in regard to their potential impact on sustainable land management and livelihoods. They are also remarkable by their spatial and temporal extent: they have been implemented in every administrative unit and have undergone an average 10-year implementation phase. Lastly, they are significant in regard to the high costs they have incurred for the state budget.

Yet, very little information is available on the results of the 5MHRP, considered to be one of the cornerstones of the national forestry policy, and its actual impacts on farmers' land-use decisions. In addition, whereas a number of local research studies have documented the impact of forestry land allocation (FLA) on forest and land management at the community level (Dinh Duc Thuan, 2005; Castella *et al.*, 2006; Nguyen Quang Tan, 2006; Jakobsen *et al.*, 2007; Sikor and Tran Ngoc Thanh, 2007), few attempts have been made to investigate underlying drivers for observed outcomes beyond the local level.

The research goal of this study was to assess whether these policies had fulfilled their objectives regarding improved land management and reforestation in the NMR, and if not, understand the roots of the gap between stated policy intentions and outcomes. The analysis revolved around three particular issues of concern: 1) linking farmers' decisions over land use and management with local meso- and macro-level incentives, and particularly state policies; 2) understanding how central policy decisions have been actually translated into a range of incentives and constraints throughout their implementation; and 3) analysing the rationale for central policy decisions and relating it with observed policy outcomes. Lastly, our objectives included a commitment to develop and disseminate sound policy recommendations. Since policies are at the heart of the study, it was natural to be concerned with communicating research results to policy-makers in order to guide future policy developments. This engagement was not only visible at the end of the research

when policy recommendations were produced and disseminated, but has been a concern throughout the whole research period. It guided the methodological development and a number of strategic choices in conducting the research.

Using the Institutional Analysis and Development (IAD) framework as a unifying canvass, our analysis has integrated methodological and theoretical elements of political ecology, the decentralisation literature and land-use change and cover (LUCC) studies in a multi-scale and multi-level analysis: we started from the analysis of farmers' land use decisions at the local level relying on ethnographical methods and institutional analysis. Then, we used these findings to build models of forest cover change, which were tested at the meso-scale level using remotely-sensed data and spatial regression analysis. It was complemented by an institutional and political economy approach which explored the underlying drivers for afforestation and policy implementation at the provincial level. Finally, a political ecology and discursive perspective provided further insights on the role of discourses in policy design at the national level.

We present in this paper how the methodology was built and applied to the analysis of forest policies in Vietnam. First; we present three specific challenges related to the research objectives and review the contribution of land-use change studies and institutional analysis for understanding the impacts of environmental policies on land use and management. Following this, the framework and methodology are presented and unrolled according to each analytical component. Lastly, we discuss how this "methodological palette" has enabled to address the identified challenges and conclude on the specific advantages and limitations of our approach.

## **1.2 Challenges**

We have identified three main challenges related to the analysis of the impact of national policies on land use and management.

Firstly, management of land and forest – and of common-pool resources in general – has increasingly relied on multiple levels of governance. In the current global context of the decentralisation of natural resources management (NRM), the rules-in-use governing the access and use of commons have more and more become complex combinations of arrangements crafted and enforced by a high number of bodies at different scales: customary rules crafted by local communities, regional directives on land-use planning and centrally-designed policies implemented by a wide range of regional and local government bodies – with often a high level of discrepancy between written rules and actual practice. National forest and land laws are dramatically transformed throughout multiple levels before affecting final land users. Studying the impact of centrally-designed policies on farmers' decisions thus requires a multi-level understanding of how and why policies might be transformed and distorted.

Secondly, the study of commons has not only to handle this multiplicity of levels, but also to address the particular challenge of drawing general lessons from micro-level observations located within a particular set of diverse and complex economic, political and biophysical situations – what was called the "Great Antinomy" by the German economist W. Eucken (1951). According to Eucken, two distinct approaches

are necessary to study contemporary complex issues. On the one hand, it is necessary to consider the everyday decisions of micro-level actors; it requires an individual-historical approach that locates these decisions with the local and historical context within which they are made and has to be based on perception, intuition, synthesis and understanding (Eucken, 1951). On the other hand, these individual decisions need to be linked with political and institutional changes in an analytical framework from which general lessons can be drawn; this theorising stage rather relies on reasoning and capacity of abstraction (Eucken, 1951).

Thirdly, to this challenge is added the complexity of the configuration of relationships that links land, forest, people and policies. Land and forest policies are indeed “hybrids” to use Latour’s term (1993), i.e. composites of nature, society and discourses. Although afforestation is often presented as an environmentally- and poverty-oriented tool, it conveys high political and economic stakes, which are often difficult to discern because kept in the backstage. Furthermore, discourses, by imposing specific categorisations of the world, apply a particular structure of knowledge and power on society (Foucault, 1980). They do not only entail the inclusion and exclusion, legitimacy and illegitimacy of social categories of actors, but also shape values, norms and preferences (Hajer, 1995). How land and forest are depicted in discourses thus influence how problems are framed and policies designed.

Not a single discipline and methodological tool can address these three challenges. The next section reviews the contributions, advantages and shortcomings of (1) the land-use change studies, which have been devoted to modelling meso-level drivers of land-use change, and more especially of deforestation and (2) institutional analysis and common property theory, which have focused on the impact of the rules governing the access and use of natural resources on their management. Although the methodology also drew theoretical insights from political ecology and the decentralisation literature, these research fields are not reviewed here as this is the object of another paper which specifically discusses the development of a “politicised” IAD framework for the analysis of environmental policy processes (Clement, 2008).

## **II. Reviewing past and present research efforts**

### **II.1. Land-use change studies**

Theoretical and technological developments in the field of land-use and land-cover change (LUCC) studies have contributed to improve our understanding of human – land interaction. Among major advances, they have allowed identifying primary drivers of land-use change and have given rise to a large number of models with high explanatory and predictive power of land-use change (for a review see Irwin and Geoghegan, 2001; Agarwal *et al.*, 2002). These models encompass (1) spatially explicit non-economic models, such as cellular-automata (Parker *et al.*, 2003) or empirical models based on remotely sensed data (e.g. Serneels and Lambin, 2001); (2) non-spatially explicit economic models; and (3) spatially explicit economic models. Spatially explicit models take into account spatial non-stationarity; they include global regression models (e.g. Geoghegan *et al.*, 2001) and local models

such as multi-level modelling (Overmars and Verburg, 2006) and Geographically Weighted Regression (Fotheringham *et al.*, 1998; Fotheringham *et al.*, 2002).

Under a LUCC modelling perspective, the study of forest policies in Vietnam would be conceptualised as the analysis of a relationship between a dependent variable – land use in Vietnam's northern uplands – and two independent variables – forestry land allocation (FLA) and state-led afforestation campaigns. However such a representation is limited for several reasons.

Firstly, it would be wrong to approximate policies as independent variables since they themselves might be affected by changes in land cover. For instance, the adoption of afforestation campaigns and decisions relating to FLA by national policy-makers in Vietnam are directly related to accounts of decrease in forest cover. The success of the implementation of afforestation programmes also depends on forest cover and particularly on the level of competition and existing repartition between tree plantations and other land uses. Secondly, whereas policies are rather easy to identify at the central level because they are embodied in legal documents, they are quite difficult to trace down to the level where land-use decisions are taken, as the discrepancies that arise between legally defined rules and actual practices are often kept hidden (Scott *et al.*, 2006).

Thirdly, the dependent variable hides a complex and diverse set of biophysical components to which are linked human activities. Incentives to use land and forest highly depend on the ecosystem considered. For instance, motives to grow natural forest or crops or to collect medicinal plants are distinct. Furthermore, the biophysical attributes of the ecosystem might also affect land-use decisions (e.g. farmers might grow fruit trees only in accessible and nearby areas they can control, because fruits are easily stolen). Thus one cannot simply apply similar assumptions regarding drivers for land-use change and land user's behaviour regarding all ecosystems (e.g. see Lambin *et al.*, 2001). Indeed, the bodies of research that have studied land-use change have adopted distinct approaches rooted in distinct theories depending on the characteristics of the natural resource considered (e.g. common-property theory for common-pool resources or public goods, and economic theory<sup>5</sup> for agricultural and urban land under private property). Because the northern uplands of Vietnam are characterised by a high diversity of interconnected socio-ecological systems, where it is not easy to neatly separate land uses, statistical models of LUCC alone might not be sufficient to tackle the issue considered in a satisfactory way.

A further problem, as McCusker and Carr (2006) pointed out, is that scholars researching on LUCC have not explored in detail the social processes that drive the variables identified as proximate causes or underlying factors (Geist and Lambin, 2002) of land-use change. Their studies have examined which aggregations of social and economic driving forces such as population density, access to roads or poverty might particularly drive land-use change/patterns. Some have integrated individual household data (e.g. Evans *et al.*, 2001; Geoghegan *et al.*, 2001; Muller and Zeller, 2002) but most have selected *a priori* explanatory variables, based on assumptions drawn from social science theory. Few studies have actually attempted to investigate deeply the social reality and to answer the question why the observed factors are the driving forces of land-use change in one situation and not in another. It is especially

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<sup>5</sup> Influential economic models include for instance von Thünen, Ricardo and Alonso models

important to analyse social processes when decisions regarding land use do not only depend on one individual but also on norms and rules-in-use that are shared by several actors, as is frequent in the upland regions in Vietnam. Indeed, with a few exceptions (e.g. Bray *et al.*, 2004; Manson, 2006), this whole field of literature has a commonality: its poor ability to understand land-use systems characterised by a high level of human interaction. One systematic attempt to characterise these social processes or human interaction has been that of institutional analysis (Ostrom, 2005). Whereas institutional aspects have been well-considered in the studies of forest management (Ostrom, 1990; Gibson *et al.*, 2000a), they have been frequently neglected in the LUC literature. Of the 19 LUC models that Agarwal *et al.* (2002) reviewed, most showed no or little consideration of institutional factors.

## **II.2. Institutional analysis applied to natural resources management**

Institutional analysis can be defined as the study of institutional design and performance. Particularly, an institutional analyst is concerned with how institutions affect the incentives and deterrents that shape human behaviour. In this paper, “institutions” are defined as: “the prescriptions that humans use to organize all forms of repetitive and structured interaction including those within families, neighborhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales” (Ostrom, 2005, p. 3). Institutions thus include all kinds of formal and informal prescriptions, e.g. the legal documents issued by the central government on forest management, the informal rules allowing state administration at lower levels to interpret these documents with relative freedom and the collective rules orally shared within a community<sup>6</sup>.

In the field of common-pool resources, institutional analysis has considerably advanced our understanding of the impact of rules on NRM (e.g. Ostrom, 1990; Thomson, 1992; Leach *et al.*, 1999; Committee on the Human Dimensions of Global Change *et al.*, 2002; Acheson, 2006; Meinzen-Dick, 2007; Ostrom, 2007). Several institutional frameworks have been developed for the study of NRM. The most prominent ones include the IAD framework, the environmental entitlements framework (Leach *et al.*, 1999) and the sustainable rural livelihoods framework, which has been used recently as a basis for institutional analysis (Messer and Townsley, 2003). In the field of policy analysis, the IAD framework (Kiser and Ostrom, 1982; Ostrom *et al.*, 1994; Ostrom, 1999) stands out as one of the most distinguished and tested frameworks (Imperial, 1999; Carlsson, 2000). Since the early 1980s, it has been extensively developed by E. Ostrom and her colleagues and has been applied to a wide range of institutional settings<sup>7</sup>. It has been particularly used as a basis for developing a theory of common-pool resource management and has been supported in this field by a strong record of empirical research and theoretical development (e.g. Thomson, 1992; Ostrom *et al.*, 1994; Thomson and Schoonmaker Freudenberger, 1997; Lam, 1998)<sup>8</sup>.

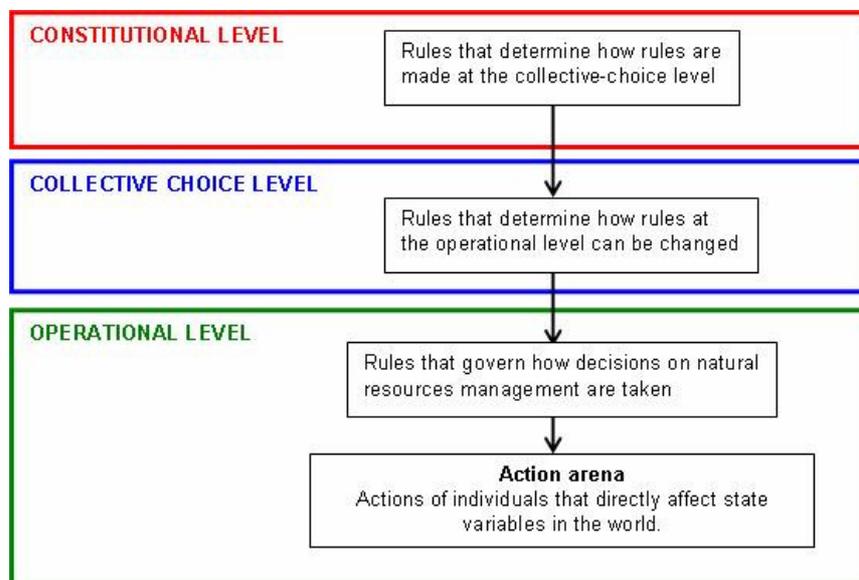
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<sup>6</sup> There is no universally shared concept of community. In a generic sense, it is usually understood as a small spatial unit with a distinct social structure and a shared set of norms (Agrawal and Gibson, 1999).

<sup>7</sup> For a thorough description of the framework, the reader can refer to E. Ostrom's presentation of the IAD (1999; 2005)

<sup>8</sup> For more references on this topic, see E. Ostrom, 2005, p. 9

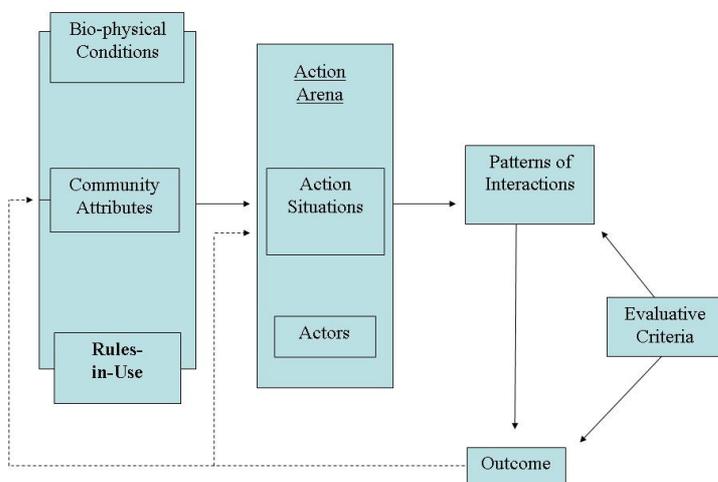
The framework is structured from the operational level, where decisions directly affect NRM, to the collective-choice level, where decisions affect the rules at the operational level (Figure 2). The collective-choice level is finally linked to the constitutional level, where decisions affect the rules that govern how decisions are taken at the collective-choice level.



**Figure 2. The three levels of analysis in the IAD framework**  
Source: Ostrom, 1999

The institutional levels of the IAD framework do not necessarily correspond to administrative levels. For instance, local communities can operate at the collective-choice or even at the constitutional levels when crafting their own rules or deciding on rule-crafting modalities.

The focal level of analysis (Figure 3) consists of an action arena, composed of actors located within action situations and affected by a set of external variables. Actors interacting within action situations lead to outcomes, which feedback into the external variables and the action arena.



**Figure 3. Detail of the IAD framework at one institutional level: the conceptual unit of analysis**

The IAD framework has been used extensively to study commons management for many types of natural resources in many regions of the world (Ostrom, 1999). It has notably advanced our understanding of key rules supporting higher performance of NRM (Thomson, 1992; Lam, 1998). Institutional analysis has formed a basis for a theory of common-pool resources, which has notably challenged Hardin's "Tragedy of the Commons" (Hardin, 1968). Common-property theory has emphasised the ability of local communities to manage natural resources without the intervention of the State and has often defended that NRM should be carried out at the lowest competent level of governance (subsidiarity principle<sup>9</sup>). A growing field of application of institutional analysis in NRM has indeed particularly examined human ability to create and maintain self-governing sustainable socio-ecological systems (e.g. Janssen and Ostrom, 2006). Associating multiple methodologies as laboratory experiments, remote-sensing, and biophysical and social ground data (e.g. Schweik, 2000; Ostrom and Nagendra, 2006; Tucker *et al.*, 2007), it has provided thorough insights on the conditions of success and failures of collective action to manage land, water, forest or fisheries within various combinations of rules, biophysical conditions and attributes of the communities (e.g. Lam, 1998; Sproule-Jones, 1999; Gibson *et al.*, 2000a; Acheson, 2006).

## **II. Overview of the methodology**

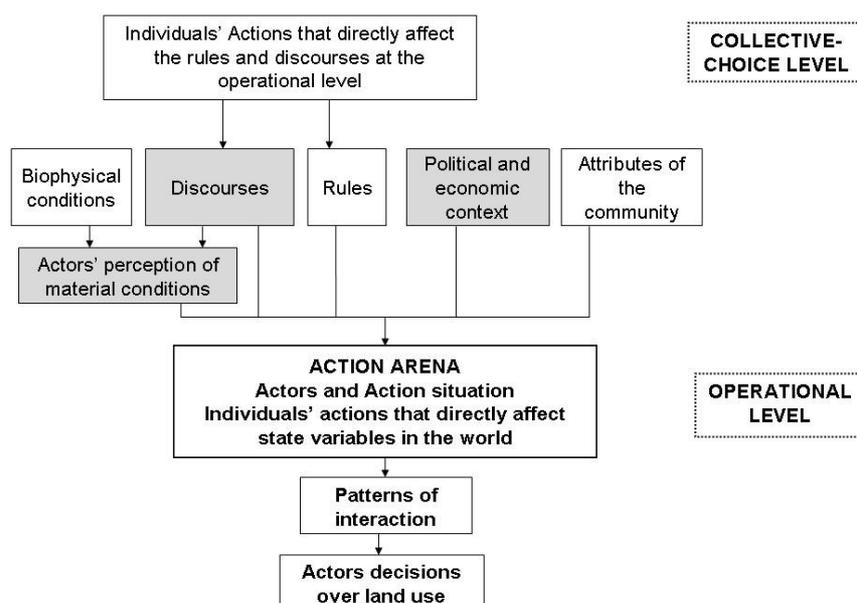
Institutional analysis was particularly pertinent for this study because the recent changes in forest and land policies in Vietnam have significantly modified the set of actors and rules-in-use governing land use. FLA has unambiguously altered institutions by fixing new rules of land ownership, access and use. In addition to introducing explicit institutional components<sup>10</sup>, the last national afforestation campaign, the 5MHRP, relies for its execution on the establishment or enforcement of existing rules-in-use on land classification, land ownership and land use.

We adopted for our study the IAD framework proposed by Ostrom, enriched by conceptual perspectives borrowed from political ecology and political economy in order to suit it better to the analysis of environmental policy-processes (Clement, 2008). Additions appear in grey in Figure 4.

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<sup>9</sup> The subsidiarity principle claims that: "powers or tasks should rest with the lower-level subunits unless allocating them to a higher-level central unit would ensure higher comparative efficiency or effectiveness in achieving them" (Føllesdal, 1998, p.190)

<sup>10</sup> The 5MHRP introduces the benefit-sharing principle which for example permits the households who are contracted for forest protection to collect all forest products from thinning. The duty and benefit of households who have been given land certificates were further specified under Decision No. 178/2001/QĐ-TTg.



**Figure 4. Detail of the revised IAD framework at the operational and collective-choice level**

The set of external variables of the original IAD framework was extended to include contextual factors (cf. Edwards and Steins, 1999), and in particular the political-economic context. In addition, this study stressed the role of discourses in the way they shape beliefs and preferences and frame the definition of problems and of their solutions (Hajer, 1995). Lastly, we considered that, more than the biophysical conditions themselves, their perception could influence actors decisions. We thus added the variable “perception of the biophysical conditions” between the biophysical conditions and the actors located in the action arena. This revision acknowledges that environmental problems are socially constructed and depend on cultural setting and on the social group of actors who observe it

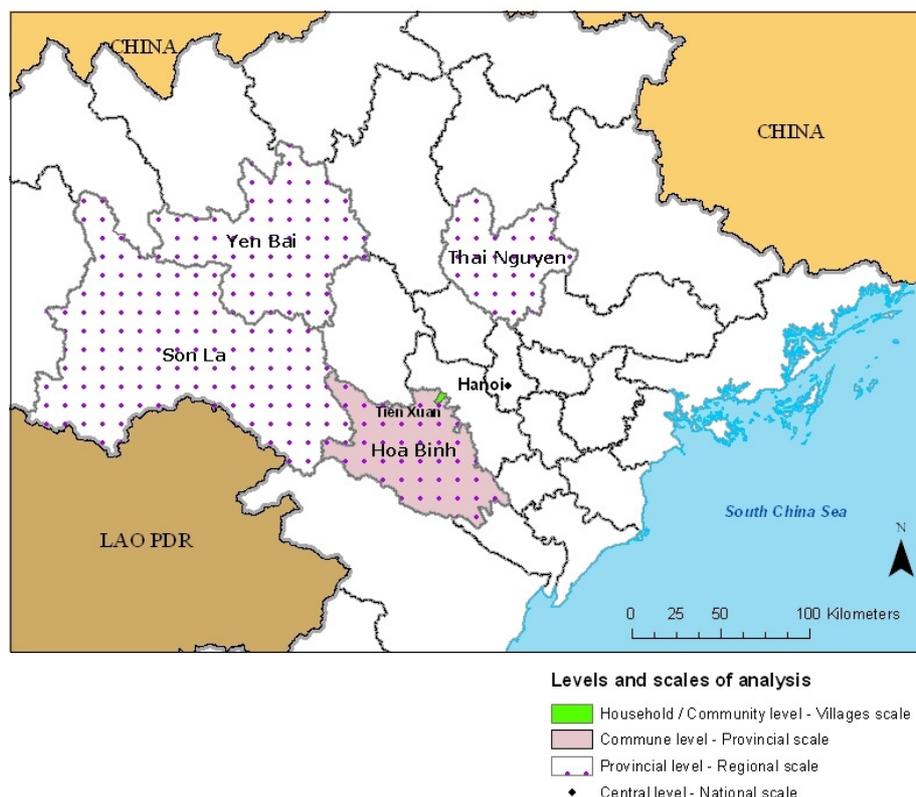
A multi-scale and multi-level perspective was adopted to link central policies with farmers' decisions. The terms “level” and “scale” are distinguished as proposed by Sayre (2005): “level” is the grain of analysis (unit of observation) and a unit of social organisation whereas “scale” is the extent of the study area / duration of the observation. The framework is organised according to two categories of interwoven levels:

- The *institutional levels of the IAD framework*, i.e. the operational, collective-choice level and constitutional levels (Ostrom *et al.*, 1994); and
- The *decision-making levels over forest and land management* in Vietnam: village (i.e. village/community), province and central levels<sup>11</sup>.

Geographical scales at which decisions were considered also vary at each level of analysis (Figure 5):

<sup>11</sup> Administrative units in Vietnam are, from the lower to the higher level: commune, district and province. Villages are not officially recognised as an administrative level but they form an important unit of community organisation and collective action for upland management. A few interviews were led at the commune and district authorities, but these levels were not investigated thoroughly due to time and capacity constraints.

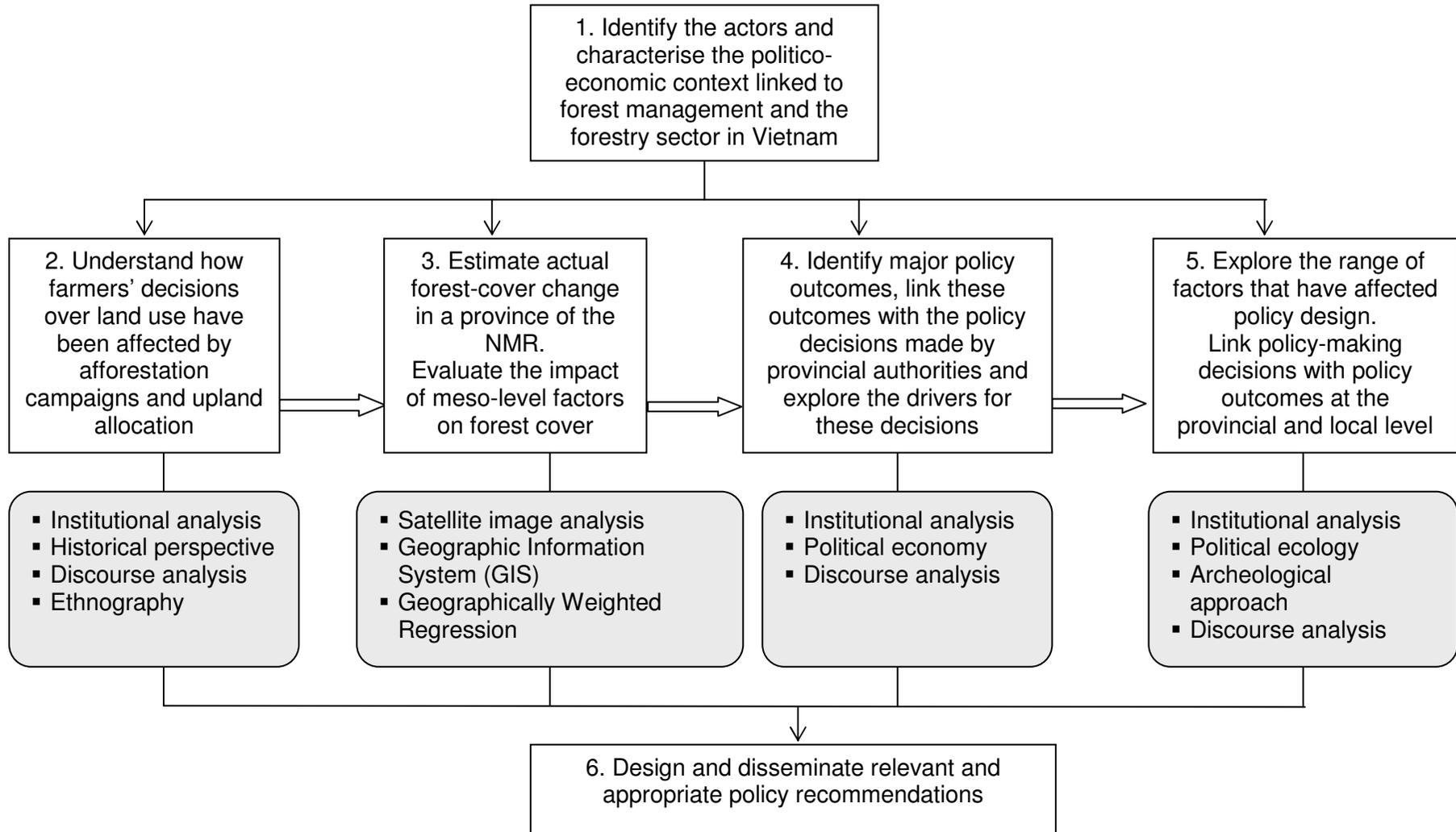
- household/community-level decisions regarding land use were scrutinised at the scale of three villages;
- drivers for forest-cover change were assessed at the commune level at the provincial scale;
- the decisions of provincial authorities were analysed from a regional perspective, covering four provinces of the Northern Mountain Region (NMR) of Vietnam; and
- the interaction of policy-makers and the design of national policies was investigated in Hanoi, the political capital of Vietnam.



**Figure 5. Map representing the multiple levels and scales of analysis**

An overview of the theoretical and methodological palette is displayed in Figure 6, according to the objectives of our study. The methodology for data collection and analysis for each component is then shortly described in the next section.

Figure 6. Flow diagram of objectives and methods used



## **II.1. Stemming from reality: Institutional analysis of farmers' decision-making process**

The study started at the local level by a study of farmers' decision-making process regarding land use and management. Based on a case study of afforestation in the uplands of three villages located in Tien Xuan Commune, Luong Son District, Hoa Binh Province in the NMR, it explored the drivers for the recent establishment of tree plantations by households and particularly the relative contribution of FLA and the incentives provided by the 5MHRP to farmers' decisions.

The methodology adopted drew from ethnography, relying on e.g. observation of daily life and customs, informal exchanges and in-depth semi-structured interviews of households and key informants (80 household interviews and 30 key informant interviews). Coupled with a historical perspective and the analysis of farmer's perceptions of forest and land management, the revised IAD framework (Figure 5) provided the basis for analysing linkages between implemented policies and farmers' behaviour.

## **II.2. Spatial regression analysis of the drivers of forest cover change at the provincial level**

Following the local level study, a quantitative analysis of forest-cover change over the province of Hoa Binh between 1993 and 2000 was performed to (1) quantify the change in forest cover in the province in the period considered; (2) assess, based on this evaluation, whether meso-level variables have played a significant role in forest-cover change, and (3) evaluate the importance of local variability in the impact of these variables.

Since we suspected that the role of state policies in farmers' land-use decisions was highly dependent on local factors, we needed a statistical tool which could explore spatially varying relationships between dependent and independent variables. Geographically Weighted Regression (GWR) proposed by Fotheringham *et al.* (1998) enables the analyst to take into account spatial heterogeneity by allowing regression coefficients to vary continuously and producing localised outputs for every observation (Fotheringham *et al.*, 1998).

Forest-cover maps were generated from the analysis of two geo-rectified satellite images Landsat TM 1993 and ETM+ 2000, using a supervised maximum likelihood classification. The maps were integrated into a GIS in order to calculate forest-cover change for each commune of the province. Then, several scenarios of forest-cover change were built, based on: (1) the findings from the local study (2) social science theories<sup>12</sup>, and (3) previous studies examining the drivers for forest-cover change in Vietnam (Le Trong Cuc and Rambo, 2001; Nguyen Nghia Bien, 2001) and elsewhere (Chomitz *et al.*, 2006).

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<sup>12</sup> For instance, von Thünen, Ricardian Boserup or Malthusian model

A set of 26 independent variables were selected to test the scenarios. These included:

- social variables: e.g. population density, poverty rate, percentage of ethnic groups);
- economic variables: e.g. distance to Hanoi, distance to roads, to State Forest Enterprises (SFEs) and to wood processing industries;
- biophysical variables: e.g. topography, soil fertility, presence of water bodies, area of agricultural land available per household
- institutional variables: e.g. percentage and area of forest land allocated to households.

Several regression models were run to test the relevance of each scenario and of various combinations of scenarios. Global and local models were compared to evaluate the importance of spatial variability. The maps of the local parameter estimates for the best models of deforestation and afforestation were displayed under ArcGIS to explore the spatial heterogeneity of the relationship between independent and dependent variables over the province at the commune level.

### **II.3. Analysis of the decisions of provincial state administration**

Next, we linked the observations of these two previous stages located at the operational level with decisions taken at the collective-choice and constitutional levels. First, we investigated decision-making process in provincial forest and land state administration. Provinces in Vietnam have *de facto* a relative freedom to implement policies, which has given rise to discrepancies between centrally designed policies and provincial implementation. This analytical component aimed to investigate the following issues: (1) what are the general outcomes of forest policies at the regional scale? (2) to which extent the decisions taken by provincial authorities have contributed to observed outcomes? and (3) what are the drivers for these decisions? (Clement and Amezaga, under review).

Fieldwork was conducted in four provinces of the NMR, including Hoa Binh Province. Visits to the provincial Departments in charge of the implementation of land and forest policies consisted of two-hour semi-structured interviews with senior officials. In total, 12 organisations and 21 persons were interviewed. The interviews explored the perceptions of land degradation, forest and forest management, the FLA process, the implementation of the 5MHRP and the characteristics of the forestry sector in each province. In addition, we collected secondary data including the provincial reports on the evaluation of the 5MHRP and FLA prepared by the provincial departments for the central government.

The IAD framework was used to analyse the decisions of provincial bureaucrats, considering policy decisions as public goods. A specific attention was thus given to dilemmas commonly associated with the provision of public goods, related to informational problems (e.g. information asymmetry) and motivational problems (e.g. rent seeking). A particular attention was given to the political-economic context and discursive setting in which provincial policy-makers are embedded, and to the rules-in-use designed by the central government, e.g. the rules for land classification or for central budget allocation to provincial state bodies.

## **II.4. Analysis of the policy-making arena at the central level**

Finally, the analysis of the policy-making arena at the central level investigated the design of policy decisions related to state-led afforestation campaigns and FLA using an archaeological approach. Discourses on land and forest management in Vietnam were scrutinised, focusing on how dominant narratives have framed problem definition and policy options. In addition, discourses and policy changes were linked with the particular incentives faced by policy-makers to support or resist particular narratives and policy orientations.

This analytical component was guided by the revised IAD framework (Figure 5) with a particular emphasis on how discourses and rules have affected policy decisions. At this stage, a particular attention was given to the characteristics and performance of the knowledge-policy interface, including the evidence-base used for policy-making and the learning opportunities available to policy-makers.

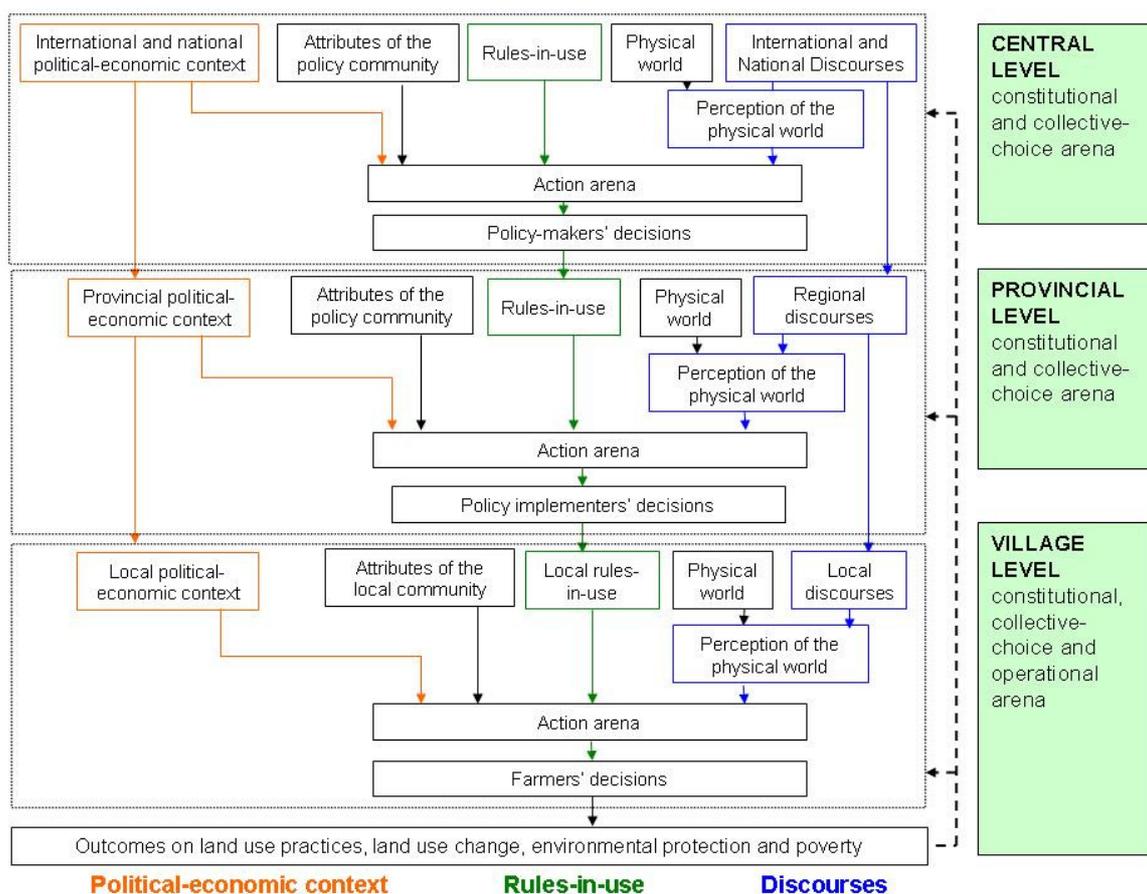
General information on the policy process was gathered through 36 semi-structured interviews of one hour conducted with foreigner and national researchers, bilateral and multilateral donors, international and national NGOs, consultants and civil servants. Interviews explored

- the discourses related to forest, land degradation and land management;
- the organisation's activities, objectives and connections with the policy-makers community; and
- the drivers of recent policy changes.

Besides, data collected during interviews were completed by grey literature, including legal documents related to afforestation campaigns and upland management and consultancy reports and donors publications related to afforestation and upland management.

## ***III. Tackling the challenges***

The analytical components described previously were assembled together using an extended version of the framework shown in Figure 5, stretched from the operational to the constitutional level and from the village to the central level (Figure 7).



**Figure 7. The overall framework used in our study of forest policies in Vietnam**

We discuss how the methodology adopted and the use of this overall framework allowed overcoming the three challenges described in the introduction: the multiplicity of levels of governance, the difficulty to generalise in-depth but localised insights and the complexity of the relationship that links forest, land, people and policies.

### III.1. Multi-level and multi-scale

The advantages of adopting a multi-scale perspective in geography have been increasingly recognised (Sayre, 2005) as it has been acknowledged that various spatial and temporal scales of analysis can lead to different interpretations in the analysis of social phenomena (Fairhead and Leach, 1998; Gray, 1999; Gibson *et al.*, 2000b; Sayre, 2005).

The multi-scale and -level perspective allowed to develop various views of the issue considered. For instance, the study conducted at the village level underlined the importance of local factors, and particularly of local institutions, in policy outcomes and in farmers' land-use decisions (Clement and Amezaga, 2008). It revealed that, despite the simultaneous occurrence of afforestation with the implementation of state policies, the latter were not directly responsible for change in forest cover. Farmers did not plant trees because of the incentives provided by FLA and state afforestation campaigns but because FLA disrupted local institutions to a point where annual cropping was no more viable (Clement and Amezaga, 2008) and tree plantations were chosen as the "least bad option". These results support the need for local

studies: what might have appeared at the meso-level as a success story of afforestation actually seriously challenges the effectiveness of state policies when examined at the local level. However, the local analysis did not fully capture the influence of meso- or macro-level factors, such as the distance to wood processing industries or population density, which variations are observable on a large spatial scale, e.g. at the district, provincial or regional scale. Spatial regression modelling brought new insights by evaluating the influence of these drivers and identifying spatial patterns of forest-cover change at the provincial level. Besides, it confirmed the spatial heterogeneity in the relationships between independent variables and forest-cover change, indicating that the impact of state policies or meso-economic factors on forest-cover change highly depends on local conditions.

The multi-level approach was necessary not only to generate distinct view angles at various spatial scales but also to relate policy design at the central level with observed outcomes on the field. For example, the analysis disclosed how the interaction of rules-in-use and discourses at the central and constitutional level can have repercussions down to farmers' decisions: the consensus-based style of the decision-making process governing the design of national policies has contributed to the ambiguity of policies, e.g. regarding the classification of forest and land. This lack of clarity on forest and land classification has in turn facilitated the decision of provincial authorities to extend more than justified the area of land classified as protection forestry land to attract the state funds directed to this land category. The increase of protection forestry land, which use is restricted for watershed and soil protection, has in turn reduced the area of land legally available to farmers for productive activities (Clement and Amezaga, under review).

Yet, although necessary, a multi-level approach is not sufficient *per se* to address the task of relating the impact of general policies with micro-level observations. Such an endeavour necessitates not only scalar but also functional links between the various components of the analysis.

### **III.2. Learning from the field**

In order to tackle the "Great Antinomy", Eucken recommended to break down complex problems into its components (1951). This is precisely what the IAD framework allows the analyst to do thanks to its nested structure arranged into decomposable components or "holons"<sup>13</sup>. At each institutional/administrative level, in-depth analyses of the decisions of farmers, provincial bureaucrats and central policy-makers were conducted. The arrangement of the main drivers into a simple set of external variables linked across institutional levels was essential to get a comprehensive understanding of how the decisions taken e.g. by the central government can impact farmers' decisions within a wide range of socio-ecological conditions.

The analytical strength of the study is of course reinforced if the analysis of each holon is based on several samples or case studies; it thus extends the scale of the analysis, captures a greater diversity of situations and facilitates the identification of the specific role of each variables in outcomes. This is why it was important to use

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<sup>13</sup> The concept of holon, first introduced by Koestler (1967) in his work on biological systems, designs a subassembly of a part-whole unit in complex adaptive systems (Ostrom, 2005)

not only multiple levels but also multiple scales of analysis: three villages at the community level, 200 communes, and four provinces. The choice of the case studies is important in how it determines the diversity of the situations examined at each level. A compromise might be necessary to ensure that there is a sufficient diversity to support the generalisation of micro-level results. At the same time a too high diversity might undermine the comparability of results among case studies.

Methodological eclecticism was also very valuable to draw general lessons from in-depth and localised analyses. Quantitative methods were useful to explore general questions starting with “what”, “where” and “how much”. For instance, GWR was relevant to inform on the most salient drivers of forest-cover change and to have an overview on how such drivers might vary over space on a large scale. It constituted a useful exploratory device and enabled to generate general findings. Yet, as observed by Serneels and Lambin (2001), the ability of descriptive spatial models to assess the influence of policies is limited. It is necessary to locate these macro-mechanisms in their socio-ecological context and investigate the “how” and “why” related to the observed macro-level processes (Folke *et al.*, 2007). In this respect, an ethnographic approach was particularly useful to disentangle a complex combination of local socio-ecological processes which caused forest-cover change. Generally, the qualitative approach permitted to identify the rationale, motives and interests of multiple decision-makers, including land users and policy-makers.

Triangulation using diverse sources of evidence and multiple methodologies at various scales also helped identifying general outcomes (Tables 1 and 2). For instance, fieldwork observations in Tien Xuan Commune indicated that the FLA *per se* had not provided sufficient incentives for farmers to establish tree plantations. A set of institutional, biophysical and economic factors responsible for this outcome was identified thanks to the IAD framework. The validity of these findings in other locations of the NMR was supported by the results of spatial regression analysis and the statements of provincial bureaucrats, researchers and development practitioners, enabling to establish general observations for the NMR (Tables 1 and 2).

**Table 1. List of most salient outcomes of the 5MHRP regarding land management and land use and the source of supportive evidence**

<b>Outcome</b>	<b>Source of evidence</b>
The 5MHRP has not succeeded in involving a majority of households in forestry and making forestry contributing significantly to household incomes.	Interviews with farmers, provincial departments senior officials, development practitioners and policy-makers (donors, researchers), supported by the results of spatial regression analysis. Review of scientific studies
Most afforestation has been led by the state on state-owned land and its extent has primarily depended on available state-owned land and budget	
There has been an over classification of forestry land in the protection category, which has reduced land available to households for productive activities and is likely to have adverse effects on food security and livelihoods of local people	Interviews with provincial departments senior officials, development practitioners and policy-makers and a review of documents issued by policy-makers (the GoV, donors)
Information on forest cover might be inaccurate.	Comparison between figures of forest-cover change in Hoa Binh Province from Landsat satellite image analysis and government statistics. Interviews with donors.
Information on the impacts of the programme is incomplete	Interviews with provincial departments senior officials, analysis of the provincial reports on the evaluation of the 5MHRP

**Table 2. List of most salient outcomes of FLA to households regarding land management and land use and the source of supportive evidence**

<b>Outcome</b>	<b>Source of evidence</b>
Although FLA to households has succeeded in hindering shifting cultivation, new land management systems have had unintended negative impacts, including rapid decrease of soil fertility and conflicts over grazing areas, threatening the viability of agricultural production in some areas	Interviews conducted with farmers, provincial authorities, policy-makers and development practitioners
FLA to households alone is not sufficient to foster afforestation	
	Fieldwork at the local level supported by a review of scientific studies conducted in the Vietnamese uplands

### **III.3. Understanding the hybrid**

The objectives of the study were to identify and analyse the drivers of the discrepancies between policy intentions and outcomes. All considered variables (biophysical conditions, attributes of the community, rules, politico-economic context and discourses) were found to participate in final policy outcomes to varying degrees depending on the institutional level. The particular advantages of simultaneously considering these variables are, first, to apprehend their co-action and co-production, and second, to evaluate which ones have been the most prominent at each level of analysis (Table 3).

**Table 3. List of the most salient drivers for policy outcomes at each institutional level in our study of forest policies in Vietnam, illustrated by an example**

Institutional level	Prominent variable	Example from the study
Operational level	Adequacy of rules-in-use with the biophysical conditions	Individual property regimes was observed to be ill-adapted to large upland areas with little accessibility and low fertility
Collective-choice level	Incentives and power distribution resulting from the politico-economic context	Critical politico-economic context for the forestry sector: state forest enterprises have to shift from a command to a market-based economy and become viable business units. Foresters are still politically very influential.
	The way rules-in-use have allowed or facilitated influential actors to design and implement policies in a way that fits their interests	Central policy-makers have designed rules which allow provinces to channel state funding through the afforestation campaign to support state forest enterprises
Collective-choice and constitutional level	Discourses have affected how problems have been framed and how policies have been designed	The assumption that the presence of forests necessarily results in improved environmental conditions has supported the establishment in the 5MHRP of the increase of forest cover as a goal <i>per se</i> , with little attention to the actual environmental and social impacts of newly established tree plantations.
		The narrative linking deforestation with shifting cultivation, demographic pressure and poverty has also been very influential and has contributed to the central decision of allocating the vast areas of uplands to households and the legitimisation of its implementation on the ground.
Constitutional level	Provision of sufficient institutional incentives by the central government to lower governance levels, e.g. support, supervision or accountability requirements	The current lack of financial and technical support of the central government for the local administration to allocate land to households has provided incentives for provincial authorities to speed up the process by allocating land to “communities” (or to Commune People’s Committees) rather than to individual households

#### III.4. Policy recommendation

The combination of quantitative studies, which aimed to measure and evaluate the physical reality with a critical consideration of scientific knowledge, with qualitative in-depth analyses of discourses and social processes helped to design “politically-aware” and “politically-suited” recommendations.

The critical examination of discourses on land and forest enabled to understand how problems had been framed and to which extent current forest and land policies had emerged as rational solutions to these problems. It is particularly important when designing policy recommendations as the latter might not be considered if they run counter to dominant narratives. Rather than dismissing prevailing narratives, Roe recommends to propose a counter-narrative (1991; 1999). The examination of power distribution and actors incentives allowed to identify unuttered drivers of policy

change. It particularly supports the choice of the appropriate path of dissemination of research results, i.e. identify the actors who are receptive and have interest to support our arguments.

Policy recommendations also need to be suited to the particular needs of policy-makers. The latter often request information acquired by what they perceive to be objective measurements of the physical reality. For instance, most central bureaucrats in Vietnam have an educational background in economics and are more easily convinced by figures than qualitative accounts. Moreover, providing solid quantitative evidence might help establishing one's credibility and then facilitate the inclusion of qualitative results.

Combining various methodologies also supported the collection of hybrid knowledge<sup>14</sup>. It entails not only relying on multiple sources of evidence but also listening to the voices of various actors. The use of hybrid knowledge hopefully contributes to a critical assessment of research findings by confronting various social constructions of the reality with scientific evidence. For instance, how forest and land are imagined and represented differs significantly between actors, across space or along history. Northern uplands have been perceived either as a vast area of unused land by a number of central policy-makers, as a rugged and unfriendly landscape for provincial officers in charge of controlling law implementation or classifying land or as a limited area which require collective arrangements to perform different types of activities such as cultivation and grazing activities in the villages investigated. Gathering the perceptions of a wide range of actors helps to understand how the motives of actors' decisions have emerged and hampers a biased analysis in favour of one group of actors versus another. Scientific evidence can be used to assess under which context and at which scale the claims of various actors apply.

Lastly, using multiple sources of evidence also helped to avoid the pitfalls of drawing simplistic representations of generic terms such as "the State", "policy-makers" or "local communities" by disclosing the heterogeneity of the views and interests coexisting within these groups of actors. For example, grounding policy recommendations on the State-society duality might be misleading. In our case, despite the consensual and politically correct discourse often prevailing in the Vietnamese bureaucracy, a number of the provincial bureaucrats interviewed expressed a critical appraisal of central policies.

#### ***IV. Conclusion***

In this paper, we make a case for the combination of multiple theoretical perspectives and methodologies for the analysis of forest policies using the concrete example of a study conducted in Northern Vietnam. We analysed the impacts of two sets of policies, the allocation of forestry land to households and a state-led national afforestation campaign, on forest-cover change and land management. We identified three main challenges related to this task: (1) the multiplicity of governance levels involved; (2) the difficulty to draw general lessons from micro-level observations; and

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<sup>14</sup> We take Forsyth's definition of hybrid knowledge (1996), i.e. the combination of local knowledge with scientific knowledge.

(3) the hybrid character of NRM policies, at the interface of nature, society and discourses.

We adopted a holistic and multi-level perspective in order to get a comprehensive picture and understanding of the major determinants of policy outcomes. We examined the drivers for the decisions of a wide range of actors ranging from land users to provincial authorities and central policy-makers. The IAD framework was used as the analytical core of the study but was enriched with several theories and methodological tools, borrowed namely from political ecology, ethnography and LUCC studies.

The three above-mentioned challenges were addressed by:

1. The consideration of several levels and scales of analysis, functionally linked into a single framework from the operational to the constitutional level:

- household/community-level decisions on land use and management were analysed at the scale of three villages;
- drivers for forest-cover change were assessed at the commune level at the provincial scale;
- decisions of provincial authorities were scrutinised on a regional scale, covering four provinces of the Northern Mountain Region (NMR) of Vietnam; and
- the design of national policies was investigated at the central level.

2. The nested structure of the IAD framework, arranged into decomposable components.

3. The use of a wide range of methodological tools at various scales. These enabled to shed various view angles in a complementary way and to evaluate the validity of our findings in various socio-ecological settings.

4. The simultaneous consideration of variables articulating the influence of nature, society and discourses on actors' decisions.

Lastly, we argue that an interdisciplinary approach also facilitate the design and dissemination of sound policy recommendations through the combination of qualitative and quantitative methodologies, the reliance on hybrid knowledge and the use of multiple sources of evidence.

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