

# Agrarian transition in the northern uplands of Lao PDR: a meta-analysis of changes in landscapes and livelihoods

Jean-Christophe Castella\*<sup>1,2</sup> Guillaume Lestrelin<sup>1,2</sup> Pauline Buchheit<sup>3</sup>

<sup>1</sup> Institut de Recherche pour le Développement, Vientiane, Lao PDR

<sup>2</sup> Centre for International Forestry Research, Bogor, Indonesia

<sup>3</sup> AgroParisTech, Paris, France

\*Corresponding author : [j.castella@ird.fr](mailto:j.castella@ird.fr)

Within a decade, entire upland regions of northern Lao PDR have shifted from a 'forest–subsistence agriculture' matrix to a landscape dominated by intensive commercial agriculture. This agrarian transition affects livelihoods in many different ways depending on local circumstances (Cramb et al. 2009). High diversity in local socioeconomic conditions and use of natural resources create a complex picture with nothing like a typical district, village or even household. This raises major methodological problems in generalising locally obtained empirical results and drawing lessons relevant to policy formulation at the regional level.

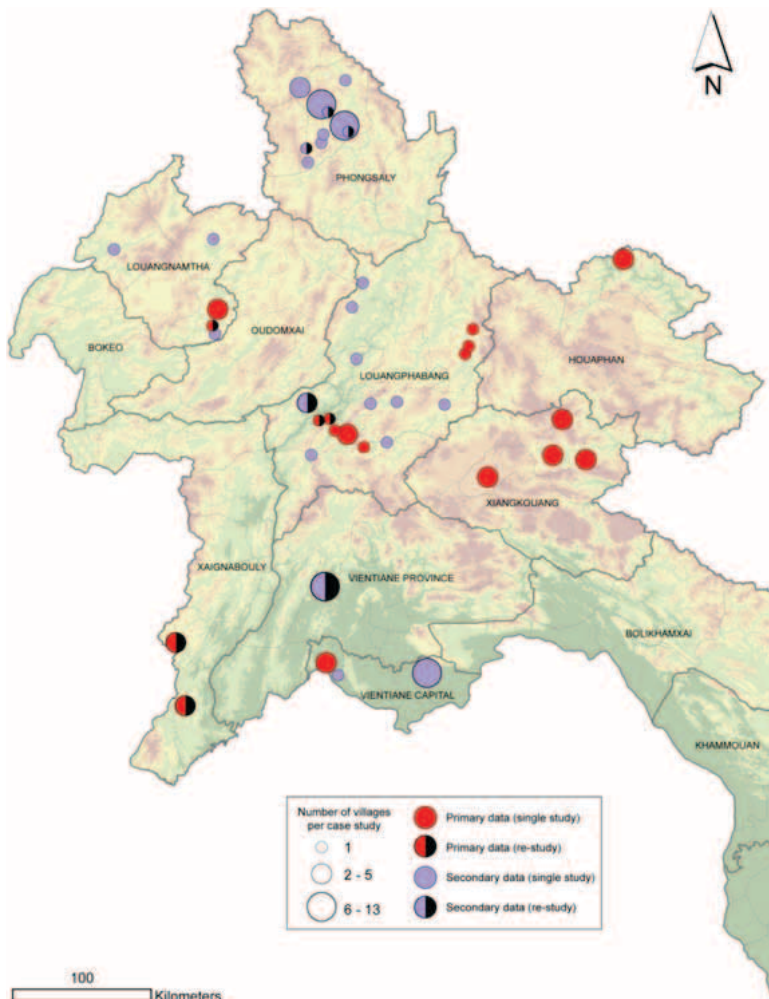
This study aimed at characterising the diversity of land-use change dynamics in the uplands of northern Lao PDR and understanding their driving forces and effects on livelihoods and forest resources. We conducted a meta-analysis of case studies to identify sites that evolved along the same trajectories of land use change. Our underlying assumption was that locations (villages, districts) following similar trajectories at a different pace or with a time lag can learn from each other and avoid repeating mistakes. If institutional structures and mechanisms are in place to support exchanges across scales and actors, this learning process can facilitate decision-making in times of uncertainty. Furthermore, the identification of locations that share the same opportunities and constraints for development may facilitate the design of appropriate technologies and spatially differentiated policies. Through an understanding of the local processes of land use change and their main driving forces, targeted introductions of technical and organisational innovations would have better chances to succeed and achieve a greater impact at the regional level.

From 2008 to 2010, we conducted 18 case studies across the northern mountains of Lao PDR. At each study site, we dedicated 6 months' intensive field work to landscape and livelihood analysis through agro-ecological zoning using time series of land-use maps from remote sensing data, household surveys and participatory scenario exploration with local stakeholders. The results were combined with secondary data from 27 other case studies so as to cover a larger range of ecosystems and development situations (Fig. 1).

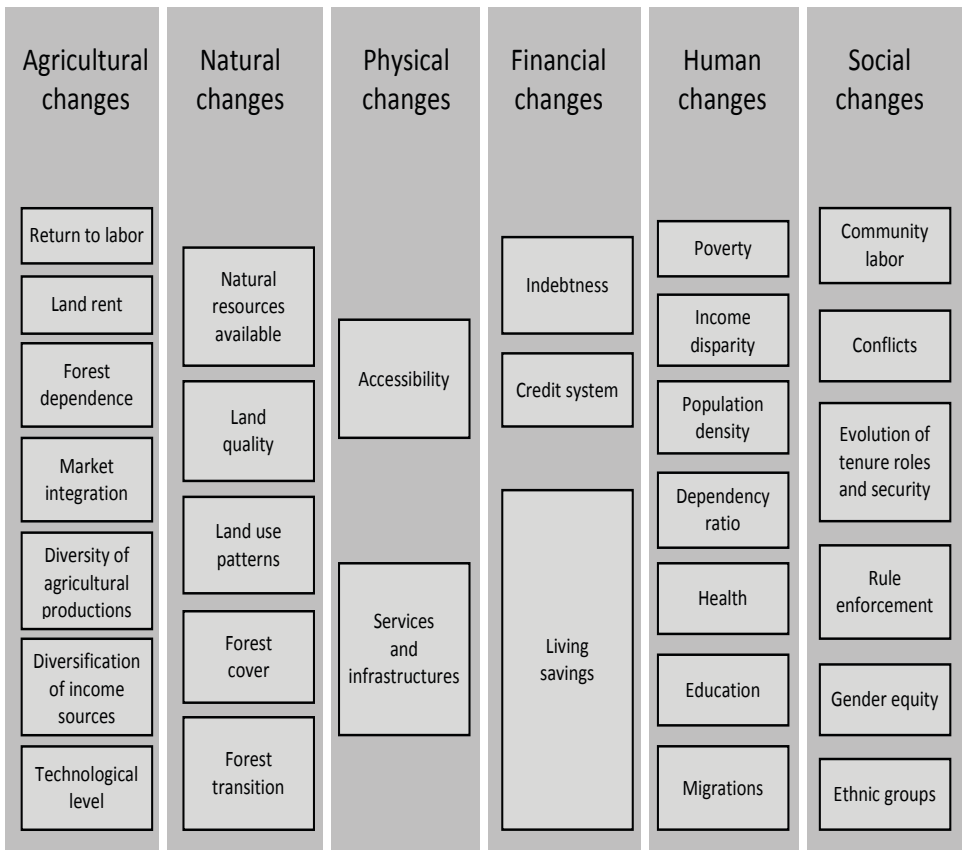
Secondary data were obtained mainly from student projects spanning 4 months to 2 years. In addition, 2005 national census data were used to document all case studies more systematically.

The meta-analysis described the local trajectories of land use and livelihood changes pertaining to each site with a limited set of indicators and then combined them into a comparative frame-work that allowed statistical comparison across sites. A series of 30 indicators of change in agriculture, livelihood and natural assets were selected to review and classify all case studies according to various modalities (Fig. 2). By using standardised ordinal variables to describe the case studies, the comparative framework could include a large range of case studies that had different scopes and methods and therefore generated heterogeneous datasets. Finally, statistical analyses were conducted to build a typology of case studies and to test the relative influence of different drivers of change.

**Figure 1:** Location of the case study sites in the northern uplands of Lao PDR.



**Figure 2:** Case studies comparative framework based on 30 livelihood and land use indicators.

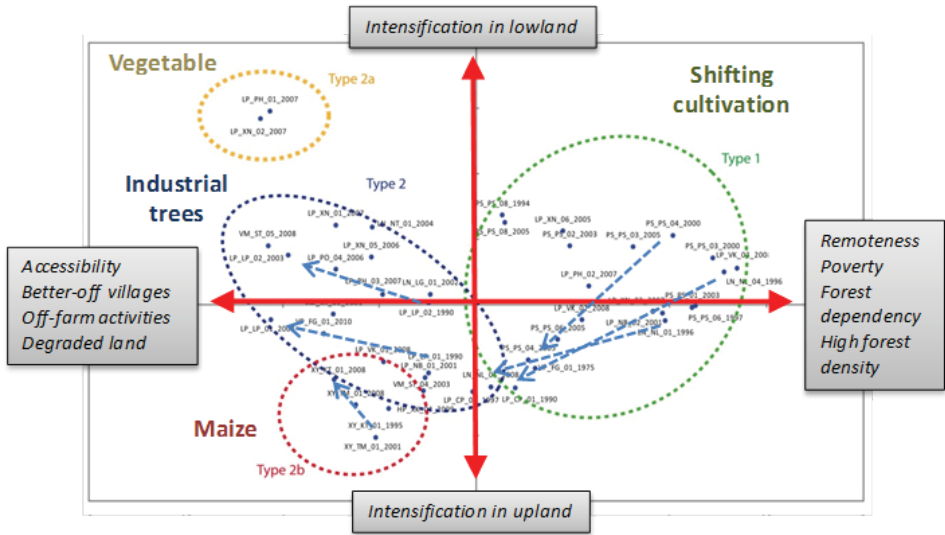


Our results show a major transformation of agricultural systems away from shifting cultivation, with a rapid diversification of agricultural production and segregation of the agricultural and natural forested landscapes. As expected, physical accessibility of the study sites constitutes the single most important factor explaining local variations in land use and livelihoods (Fig. 3).

Population density, tenure rules and ethnic diversity also play important roles. Although many qualitative analyses have drawn similar conclusions, the meta-analysis outlines the intensity of these trends, their spatial distribution and their driving forces.

Three main development trajectories emerged: a mainstream trajectory which reflects market integration and a gradual diversification of land use and livelihood activities, and two alternative pathways which differentiate farm investment and land use intensification in the lowlands and in the uplands respectively.

**Figure 3:** Patterns of livelihood change in northern Lao PDR from a principal component analysis.



The transition from subsistence to market-oriented agriculture results from the combined effect of internal and external, local and global forces of change. The main driving forces of land use change in the mountainous areas of Lao PDR are (1) the changing accessibility to market, education, health services and technical information; (2) the rapid expansion of commercial plantations in relation to market demand for rubber, biofuels, timber and animal feed; (3) successive land policies (e.g. land use planning, land allocation, village consolidation and resettlement, land concessions); and (4) environmental regulations aiming at preventing land degradation, deforestation and loss of biodiversity. The complex mechanisms of interaction between livelihood systems, market forces and public policies require thorough investigation at the interface between local and regional processes of change in order to mitigate their potential negative effects on poverty and on environmental degradation. Our meta-analysis of case studies addresses such research challenges. Further monitoring of the agrarian transition by adding further case studies will help provide adapted policy responses (i.e. timely and locality specific) to emerging changes.

We conclude that there is no need to ‘force’ the eradication of shifting cultivation. as the practice will disappear anyway in most accessible landscapes. Development effort and resources would be better invested in buffering the potentially negative consequences of rapid market integration on people (e.g. through education) and the environment (e.g. through soil and forest conservation). Improved education in remote rural areas could keep the next generations out of poverty while reducing their dependence on forests and natural resources. On the other hand, land degradation, biodiversity loss and subsequent decreases in land productivity are avoidable outcomes of agricultural intensification.

It is possible to promote a smooth transition from shifting cultivation to conservation agriculture and avoid the 'resource curse' of conventional agriculture (i.e. with tillage, chemical fertilisers and pesticides). Yet conservation agriculture practices as they have been promoted in recent years are only at the beginning of their adoption phase; strong commitment and political will are required to consolidate promising results and achieve wide-ranging and lasting impacts.

## **Keywords**

Land use change, Laos, subsistence agriculture

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Distributed by CIRAD, UPR SIA - TA B 01/07, Avenue Agropolis, 34398 Montpellier cedex 5, France  
Tel.: +33 4 67 61 56 43; [christine.casino@cirad.fr](mailto:christine.casino@cirad.fr)

And

Northern Mountainous Agriculture and Forestry Science Institute (NOMAFSI),  
Phu Ho Commune, Phu Tho town, Phu Tho Province, Vietnam

And

University of Queensland, Centre for Communication and Social Change,  
School for Journalism and Communication, Brisbane Qld 4072, Australia