

Environmental Dimensions of the Agrarian Transition in the Uplands of the Lao PDR

Guillaume Lestrelin, Jean-Christophe Castella
Landscape Mosaics Programme, CIFOR, Vientiane, Lao PDR
E-mail: g.lestrelin@gmail.com, j.castella@ird.fr

The agrarian transition is considered as one of the most important drivers of socioeconomic transformation that has occurred over the past three centuries. While abundant, the related scientific literature exhibits significant lacunae with regard to the links between social change, ecological dynamics and environmental politics. Intended as a contribution to a better understanding and theorization of the agrarian transition, this project combines physical measurements, aimed at characterizing the state and dynamics of the ecological milieu, with surveys on local livelihood change, environmental knowledge, discourses and practices in contrasted localities of the Laotian uplands. On these grounds, a comparative analysis of local trajectories of agrarian transition is undertaken.

‘Declining productivity of traditional shifting cultivation systems’, ‘market integration’, ‘livelihood diversification’ and ‘de-agrarianisation’ appear as keywords for describing the rapid socio-ecological transition currently under way in the uplands of the Lao PDR. Traditionally based on rice production for subsistence, agriculture becomes increasingly commercial and diversified with the introduction of annual cash crops and the development of livestock farming, vegetable gardening and tree plantation. Traditional, non-agricultural activities such as weaving and non-timber forest products (NTFP) collection are also intensified and become largely market-oriented. Finally, with the emergence of new, sometimes extra-local, non-farm activities like factory work and petty business, upland communities appear to be engaged in a dual process of livelihood diversification and de-agrarianisation.

The demise of subsistence agriculture

Simultaneously, an increasing corpus of evidences made available by case studies suggests a land degradation trajectory. Underlying this trajectory is an intensification of the shifting cultivation systems and an acceleration of commercial crop rotations. While the consequences of this intensification for soil erosion processes is not clearly established, it has been shown to be responsible for a progressive exhaustion of the soil as the reduced fallow biomass affects the maintenance/renewal of the physical, biological and chemical properties of the soil. The intensification also favours weed invasion as the length of the fallow period is an important element controlling weed germination. In turn, weed invasion gets compounded with soil exhaustion to affect the productivity and profitability of shifting cultivation.

In many instances, livelihood diversification and de-agrarianisation can be considered as a reaction to the above land

degradation issue. Without fundamental change in the composition of their livelihoods, some farmers attempt to maintain agricultural production by cultivating larger areas and allocating additional labour to annual crop cultivation. Engaging more radical changes, other farmers shift to non-farm occupations and, thus, are able to untie their livelihoods from land-related constraints. The mainstream trajectory, however, is often one of a general increase in and reorganization of the household’s time and labour in order to engage with a more diverse panel of income generating activities. Overall, by diversifying their activities, engaging in non-farm occupations and on-farm alternatives to shifting cultivation, upland-dwellers reduce indirectly the constraint of declining shifting cultivation yields on their livelihoods.

Market forces and economic integration

Market forces also play a significant role in fostering local changes. Since the mid-1980’s and the implementation of wide ranging economic reforms by the Laotian government, upland populations have started to engage with new production and consumption models. The development of commercial agriculture and non-farm occupations is directly related to both increasing and changing local needs and expenses, and the emergence of new employment opportunities brought about by Laos’ economic growth. In that sense, market integration provides upland-dwellers with options for diversifying their incomes and, to some extent, adapting to land degradation. Yet, the transition can also have perverse effects on local resource extraction. The demand of a growing and relatively wealthy urban population encourages sometimes the overexploitation of resources such as NTFPs and firewood. In addition, the emergence of a land market and economic incentives for timber or bioenergy production

can also encourage upland-dwellers to convert agricultural land into tree plantation and/or to sell their land. In turn, this process contributes to reduce the area available for shifting cultivation and, ultimately, fosters the above land degradation trajectory.

Environmental policy and regulations

Finally, environmental policy contributes also to shape current land use changes. Although assessments differ in terms of the exact extent and significance of the issue, the Laotian government and major international development agencies with a presence in the country agree on the fact that Laos' development is threatened by a 'chain of degradation' stretching from deforestation, increased rainfall runoff and soil erosion to downstream sedimentation and siltation of wetlands and reservoirs. The uplands are attributed a particular role and importance in this process. In a context of ecological fragility, arable land scarcity and endemic poverty, shifting cultivation is believed to combine with population growth to engender deforestation and soil erosion which undermine farming activities and exacerbate poverty. In turn, increased poverty drives upland populations to further intensify their pressure on natural resources in order to maintain a decent living. In line with the 'chain of degradation' perspective, this downward spiral is further represented as a threat to lowland activities.

This perspective has had wide-ranging impacts on rural development policy which, in the uplands, has long favoured forest conservation over agriculture. In particular, land-use planning

and land allocation have been used as main regulatory instruments for re-organizing local access to land resources, delineating forest conservation areas, reducing the allocation of fallow land per capita and, hence, limiting the extent of shifting cultivation. The idea that shifting cultivation and population growth engender a downward spiral of land degradation and poverty in the uplands has also provided incentives for the relocation of remote communities closer to state services and with better access to markets. Many villages have thus been recipients for populations relocated from remote areas, with significant impacts on local access to land. Ultimately, land reform and resettlement policy have often engendered critical situations of agricultural land shortage which, combined with plantation conversion, land sale, natural population growth and unplanned immigration, have propelled and sustained the abovementioned land degradation trajectory. Consecutively, this (partly policy-induced) land degradation issue has drawn upland communities into a rapid diversification/de-agrarianisation process (Fig. 1).

The environmental 'factor' plays thus a central role in the observed livelihood and land-use changes. On the one hand, land degradation processes such as soil exhaustion and weed invasion constitute major driving forces for economic diversification and a progressive de-agrarianisation of local livelihoods. In that sense, the environment is bound up materially in the agrarian transition. On the other hand, the land degradation 'issue' as defined by the Laotian authorities and some of their development partners represents a significant impetus for various political measures that have had critical impacts on

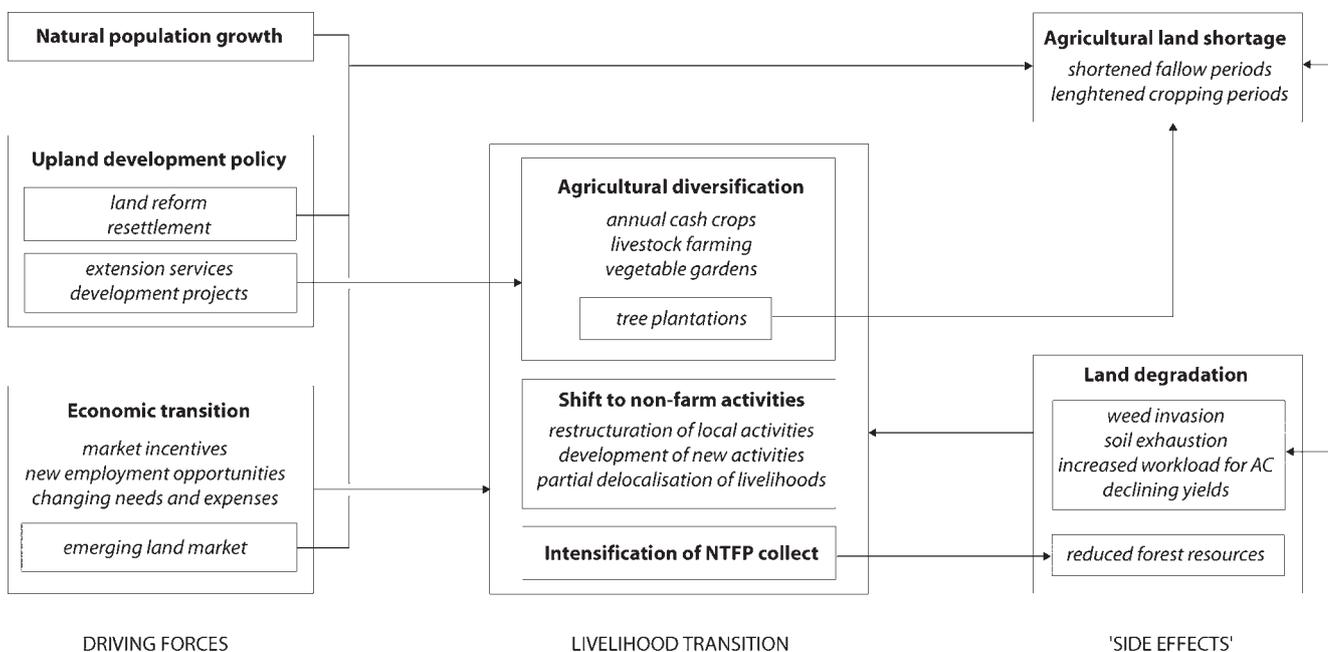


Fig. 1: Livelihood transition in the Laotian uplands: driving forces and side-effects. Source: Lestrelin (2009).

local land-uses and, in turn, land degradation processes and extent. The environment is thus also bound up discursively in the observed agrarian transition.

In the end, understanding patterns of agrarian change requires paying careful attention to both ecological conditions and environmental representations. Changes in ecological conditions are indeed both causes and consequences of livelihood change while environmental representations condition directly local adaptive responses to ecological change and more indirectly, through their impact on policy and regulation, local livelihood constraints and opportunities. Building upon the latter observation, the project intends:

- To contribute to a better understanding and theorization of the agrarian transition by analyzing its environmental dimension, both biophysical (ecological conditions and dynamics associated to the agrarian transition) and socio-political (environmental knowledge and its influence on local practices and rural development policy), and
- To feed the political debate on sustainable development by modelling the impacts of various environmental policies on local socio-environmental change.

Selected publications

- Castella, J.-C., Douangsavanh, L. and Messerli, P. (2010): Global agendas versus local realities - implementing policy relevant research for upland development in Lao PDR. Paper presented at the 7th International Science Conference on the Human Dimensions of Global Environmental Changes, 26-30 Apr. 2009, Bonn, Germany.
- Ducourtieux, O. and Castella, J.-C. (2006): Land reforms in the uplands of Vietnam and Laos: Preserving forests or livelihoods? International conference 'At the frontier of land issues: Social embeddedness of rights and public policy', 17-19 May 2006, Montpellier, France.
- Lestrelin, G. and Giordano, M. (2007): Upland development policy, livelihood change and land degradation: Interactions from a Laotian village. *Land Degradation and Development* 18(1): 55-76.
- Lestrelin, G. (2009). Changing lives, changing nature(s): socio-environmental transitions in the uplands of the Lao PDR. PhD thesis, Department of Geography, University of Durham, UK.
- Lestrelin, G. (2010): Land degradation in the Lao PDR: Discourses and policy. *Land Use Policy* 27: 424-439.
- Lestrelin, G. and Castella, J.-C. (in preparation): Territorializing sustainable development: Policy and practices of land-use planning in the Lao PDR.

The Expansion of Rubber and its Implications for Water and Carbon Dynamics in Mainland Southeast Asia

Jefferson M. Fox¹, Thomas W. Giambelluca², Qi Chen², Alan D. Ziegler³

¹East-West Center, Honolulu, Hawaii, USA

²Geography Department, University of Hawaii at Manoa, Honolulu, Hawaii, USA

³Geography Department, National University of Singapore, Singapore

E-mail: FoxJ@EastWestCenter.org (Jefferson M. Fox), thomas@hawaii.edu (Thomas W. Giambelluca), qichen@hawaii.edu (Qi Chen), adz@nus.edu.sg (Alan D. Ziegler)

Rubber (*Hevea brasiliensis*) is the major commercial crop replacing traditional agriculture and secondary forests in upland areas of mainland Southeast Asia (Ziegler et al. 2009). Our preliminary research suggested significant plausible impacts of rubber cultivation on watershed hydrological processes (Guardiola-Claramonte et al. 2008, 2010). Hydrologic change within these upland watersheds could have serious consequences for the approximately 200 million inhabitants of the region's lowlands. The overarching science questions being addressed by our project are three-fold: 1) How does the conversion from existing land covers to rubber affect local energy, water, and carbon fluxes, 2) How extensive will rubber become, and 3) What are the consequences of those changes for regional hydrology and carbon sequestration?

Rubber is native to the humid tropics and has traditionally been cropped in the equatorial zone between 10°N and 10°S. In mainland Southeast Asia this included portions of southern

Thailand, southeastern Vietnam, and southern Myanmar. In the early 1950s, China invested in research on growing rubber in marginal environments and eventually established state