

Land Use Transition, Livelihoods, and Environmental Services in Montane Mainland Southeast Asia

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Land Use Transition, Livelihoods, and Environmental Services in Montane Mainland Southeast Asia

The present article provides an overview of the status of land use and land cover change science in Montane Mainland Southeast Asia in the context of a Mobile Workshop. Outcomes of the Mobile Workshop highlighted the rapid changes in land use and livelihoods, largely driven by the development of transport links, increasing market access, and trade liberalization. While many of these changes are likely to be beneficial, they must be carefully moni-

tored, and relevant policies should be inclusive of all stakeholders. This is why it is important that land use science be cognizant of the need to make information accessible to policy-makers and land users.

Introduction

MMSEA: A critical area in transition
The Montane Mainland Southeast Asia (MMSEA) eco-cultural region

comprises those areas between 300 and 3000 m lying within the basins of the Yangtze, Salween, Irrawaddy, Mekong, Black, Red, and Pearl rivers (Thomas 2003; Fox and Vogler 2005). This region constitutes approximately half of the land area of Cambodia, Laos, Myanmar, Thailand, Vietnam, and Yunnan Province of China (Figure 1). National states have a strong interest in the political and environmental security of

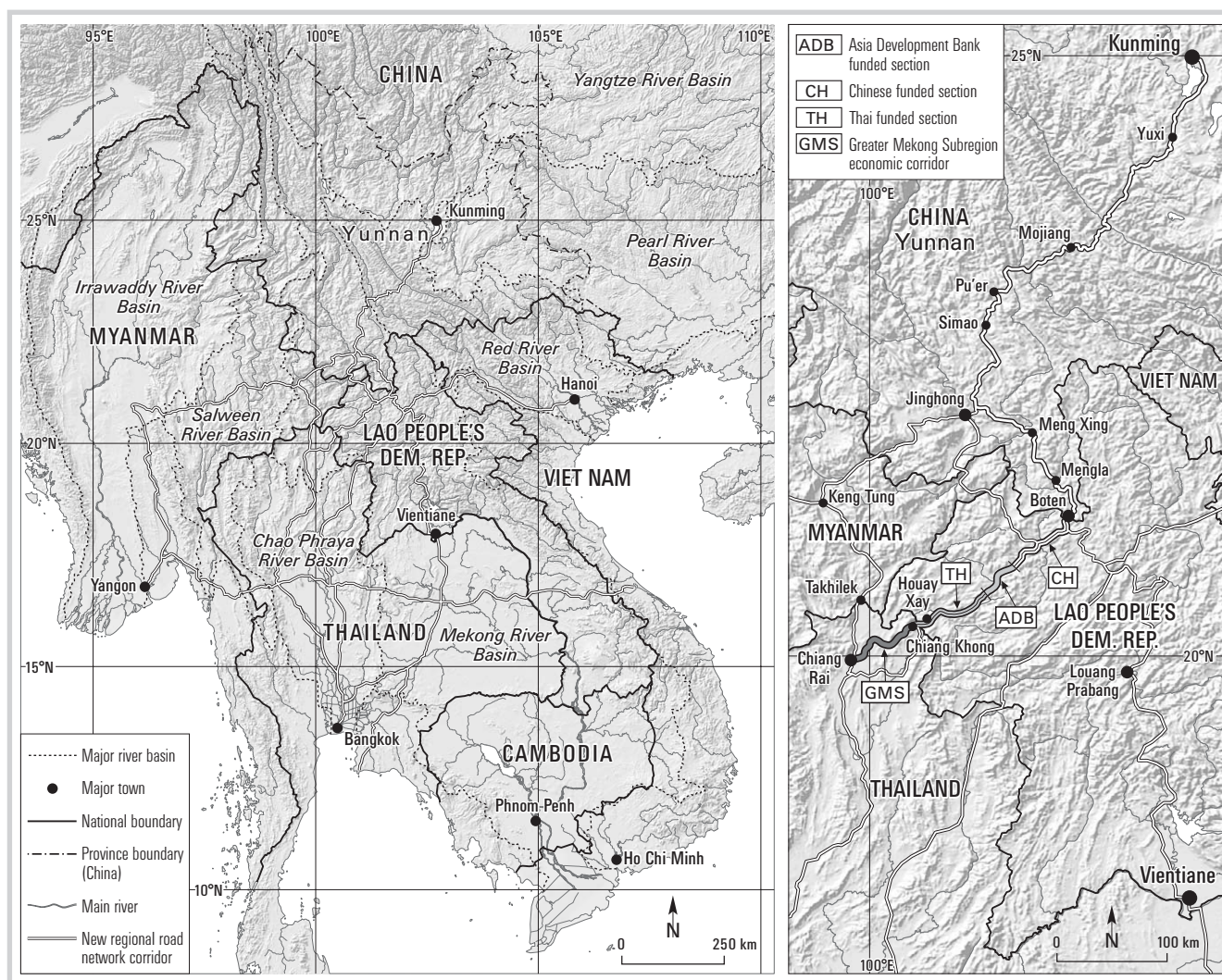


FIGURE 1 The Montane Mainland Southeast Asia (MMSEA) eco-cultural region, showing main river basins and the road network that is being upgraded in the region. The map on the right shows the Kunming-Bangkok highway, an economic corridor linking China, Laos, and Thailand, funded by several parties. (Map by David Thomas and Andreas Brodbeck, based on data from various sources)

MMSEA, as the rivers it supports affect the lives of more than 600 million people in the Greater Mekong Sub-region (GMS)—an area undergoing rapid economic growth and regionalization.

The ecological health of the “roof” of southwest China and Southeast Asia is rapidly deteriorating: during the past two decades, the Yangtze, Red, Mekong, Tonle Sap, and Chao Phaya rivers have flooded more frequently, causing some of the worst devastation in recorded history. In addition, development of vast communication and transportation infrastructure along the Mekong and other river systems is having great impacts on land use, livelihoods, and environmental services.

There is increasing debate about the need to balance possible over-exploitation of MMSEA’s natural resources against the sustainability of the region’s ecosystem services. Rising population and consumption will drive competition for diminishing resources, requiring trade-offs between ecosystem goods and services among different stakeholders at different scales. Land use decision-making in this climate is politically and economically driven; therefore, to understand these issues, it is necessary to identify and quantify the links between changes in land use, ecology, and socioeconomics.

From 15–27 January 2005, 60 participants from 8 countries participated in a unique learning process: a ‘mobile workshop’ on land use history. This workshop traversed the heart of the MMSEA eco-cultural region, from Xishuangbanna in southern Yunnan, overland to Luang Prabang in northern Laos, before flying to Chiang Mai in northern Thailand. Throughout, participants interacted with local villagers and officials to learn about land use history and decision-making, in the context of the local impacts of state policies and emerging market economies. The workshop had several objectives:

- To better understand the land use dynamics and drivers of change in the transition to market economies within MMSEA;
- To assess the impacts of development, particularly road infrastructure, as well as linkages among transportation corridors, marketing networks, and trade policies;
- To build capacity among younger researchers to conduct interdisciplinary research related to land use transition; and
- To provide a forum for policy dialogue and recommendations.

The workshop focused on 3 major interlinked themes: 1) land use change, 2) local livelihoods/markets and trade, and 3) resource governance. Accordingly, 3 thematic working groups were formed to explore and analyze field work and share impressions of the impacts of road building and trade liberalization on land use, livelihoods, and governance in MMSEA.

Historical land uses and cultural exchanges in MMSEA

The northern parts of Thailand, Laos, Vietnam, and the southern part of Yunnan, China support 100 million people, comprised of more than 60 different ethnic minorities. These people practice various forms of land use and livelihood activities. In southern Yunnan these practices include swidden agriculture with rice and rubber by the Hani, Jinuo, and Yao peoples; and paddy agriculture and homegardens with rice, vegetables, and rubber by the Dai in Xishuangbanna. Similarly, in Laos, extensive swidden practices are traditionally conducted by a wide diversity of ethnic groups, including the Hmong, Yao, Akha, Khmu, and Lamet. Meanwhile, lowland agriculture has long been a domain of the Tai-Kadai ethnolinguistic group, centering on paddy rice cultivation. In northern Thailand, there are the well-managed watersheds of the Karen and the now highly natural

resource-exploitative practices of some of the Hmong.

MMSEA not only provides diverse ‘niches’ for specific livelihoods but also accommodates flexible institutions for resource governance. Relationships between these customary organizations have long affected both the highlands and the lowland plains. Historically, valley-based polities have played an important role in organizing the social and economic relationships among the lowland inhabitants and the people living in surrounding mountainous areas (Coward 2002; Chiengthong 2003). The practices of ‘rights of occupancy and use’ versus ‘rights of domination’ are also crucial when trying to understand the relations between indigenous peoples and recent migrants.

For more than a millennium, in MMSEA caravans served as market links and created sociocultural networks among mountain and lowland communities. Until the 19th century there were still free movements of ethnic groups across the current borders of China, Laos, Myanmar, Thailand, and Vietnam. Today, the caravan trade has been replaced by modern transportation systems, such as the proposed Kunming–Bangkok highway (see Figure 1), and economic corridors have evolved into transnational highways, riverways, and railway links. These changes have profound impacts on local land use, resource management, livelihoods, and indigenous cultures. Continuing research in MMSEA and elsewhere suggests that land use dynamics and transitions in the tropical uplands need to be analyzed in broader context of political economies (Rambo et al 1999; Fox 2002; Xu et al 2005a).

Land use transition: why should we care?

Transition theory

The pace and intensity of land cover change have increased over the past 3 centuries—and, more partic-

ularly, over the last 3 decades—due to climate change and increasing human activities, including migration, land use conversion, and agricultural intensification (Lambin and Geist 2006). Land use transitions are pervasive at a variety of spatial and temporal scales; they significantly affect ecosystem services and thus livelihoods, economics, and trade policies. To understand current changes and predict future ones, it is essential to adopt a long-term view of land use history. For these reasons it is necessary to consider the mechanisms of transitions, both environmental and economic.

Transition theory has been generalized from complex socioeconomic phenomena such as changes in population, economics, and health. To trace the transformation of predominantly rural societies into market-driven economies, for example, Kuznets (1955) pointed out that during modernization, income distribution is relatively equal at the initial stages of economic development. However, as the economy grows, income inequality rises as segments of the labor force abandon agriculture for higher-paying industrial and service jobs. However, this inequality later declines as urbanization diffuses and the industrial and service sectors expand. Thus, inequality follows a Kuznets curve (Figure 2).

Similarly, land use and forestry transition theory derives from the notion of ‘environmental Kuznets curves’ that predict non-linear tran-

sitions in resource use as incomes rise over time. Thus, forestry transition theory posits that over time, forest cover exhibits a U-shaped curve: an initial decline in forest cover due to deforestation is later reduced, offset, and eventually outweighed at some point by forest recovery and secondary forest expansion. Mirroring this, agricultural expansion may initially rise, but later starts to decline through increasing agricultural adjustment to land quality and technological improvements. Indeed, such transitions now seem to be occurring: since the early 1990s, forest areas have reportedly expanded in many developed countries (Grainger 1995; Rudel 1998; Mather 2001; Rudel et al 2005).

However, in an attempt to more precisely monitor and predict land use and land cover change, national monitoring has been increasingly abandoned in favor of analyses at the sub-national scale (Rudel et al 2002), and even at local micro-levels that directly affect land use practices (Perz et al 2005). Related research attempts to link deforestation to economic development and regional governance by reference to environmental Kuznets curves (eg Mather et al 1999; Zhang et al 2000; Ehrhardt-Martinez et al 2002). Moreover, sustainability studies are increasingly turning towards transition analyses to identify pathways and drivers of change, and to explore alternative trajectories of change that reflect a range of issues including political economies, environmental services, and market transition.

Land use and social transition in MMSEA

MMSEA has experienced widespread and dramatic land use changes. Deforestation, agricultural expansion, urbanization, and, most recently, re-afforestation have resulted from changing government policies and modernization. Such changes are exemplified by China's push to develop industry and become more self-sufficient in natu-

ral resources. China pursued self-sufficiency in rubber during the 1960s and 1970s, timber during the 1980s and 1990s, and grain production during the collective periods from the 1950s to the early 1980s (Xu et al 1999 and 2005b; Xu and Wilkes 2005). Similar trends can now be seen in Laos, Thailand, and Vietnam with the development of cash crops and market industries.

When analyzing land use changes, it is very important to recognize that land use and property rights in MMSEA have always been influenced greatly by political perspectives and ideologies. The power bases of land use decision-making are lowland urban areas. Generally, mountain regions are perceived as sources of potential resources; consequently, logging, mining, and hydropower have been operated by state-owned enterprises for the benefit of the lowlands. Construction of huge hydro dams has directly caused the loss of mountain biodiversity and had many negative social impacts. Millions of people have been resettled or displaced from their original homes, and it could take generations for them to adapt to alien environments, meaning that mountain people are further marginalized. Moreover, traditional upland practices are often portrayed negatively in MMSEA. For example, swidden agriculture, rather than being viewed as sustainable land use, is held responsible for deforestation in the uplands, leading to downstream flooding and siltation (Fox et al 2000; Ives 2004; Xu and Wilkes 2005).

Thus, whereas lowlanders have profited from mountain resources, mountain people have often lost out. These losses are often exacerbated by knock-on effects that can further disadvantage mountain communities; for example, deprivation of local livelihoods has forced many upland households to sell their labor in the plains and in foreign countries. In some mountain areas, male outmigration is so widespread that women are now de facto heads

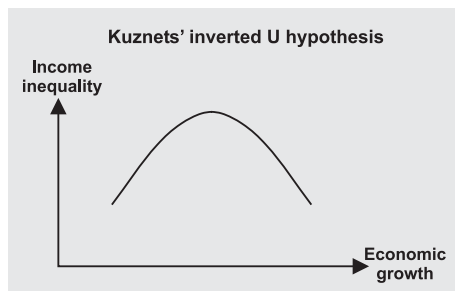


FIGURE 2 Typical income transitions during economic development.

of households, managing forests and farms in degraded ecosystems, often far removed from social services such as healthcare and education (Xu and Greta 2005).

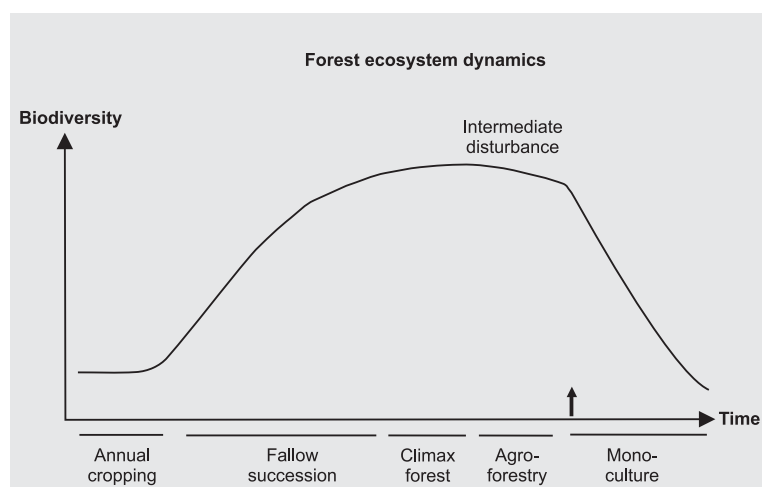
Land use change science has been intensely discussed at previous MMSEA conferences in Chiang Mai, Thailand (1995, 2000), Lijiang, China (2002), and Sapa, Vietnam (2005). These meetings encouraged interdisciplinary and participatory research to make land use/cover information and knowledge more accessible and usable to research professionals, policy-makers, advocates, and development practitioners. Similarly, the object of this paper is to try and link models and empirical data on land changes in MMSEA with the drivers of specific land use histories. Such links provide some potential for predicting trajectories of change. This discussion is set against the background of the Mobile Workshop, in which a fusion of disciplines worked towards a more complete understanding of the social and environmental outcomes of land use changes.

Key findings of the Mobile Workshop

During the workshop, the participants contributed greatly to our understanding of where, when, how fast, and why people change their use of the land in the MMSEA eco-cultural region. There were a number of key findings from this Mobile Workshop:

1. Most of MMSEA's ecosystems have now been altered by land use transformation, mainly through human action. Land use change is inevitable, and all 3 countries under consideration have had major changes in recent decades. Various government policies and the expansion of regional, national, and international markets are among the most powerful contemporary drivers of land use and land cover change, further influencing both ecosystem goods and services and household economies. There is a great deal of variation and site specificity determining the positive or negative influence of drivers, the sustainability of land use, the resilience of ecosystems, and the vulnerability of ethnic groups.
2. MMSEA forest decline has been accompanied by a rapid expansion of secondary vegetation and tree plantations. Regionally, deforestation has begun to slow down; there may even be a net gain in forest, although the quality of this forest is debatable. Attempts have been made to promote tourism and other upland development policies to create non-farming jobs to remove farmers from the land. Governments in China, Laos, and Thailand have been pioneering similar land use policies in the uplands, such as creating protected areas, sedentarizing swidden agriculture, banning logging, establishing tree plantations, and decentralizing forestry management. However, policy implementation often fails to stimulate land use transition. Policy-makers could be more successful if they addressed the underlying causes of land use change (technology, market access and trade networks, migration policy), rather than the proximate causes (logging, rubber plantation, road development).
3. Livelihood practices are driven by market demand. People are influenced to replace traditional cultivation with crops that command better prices in the market. Private and state support systems emerge as a result of changes in livelihood, and such changes also create labor mobility. This development process is self-perpetuating, as access to better infrastructure normally results in the expansion of markets and marketing opportunities. Policy intervention should be seen as a controlling agent, preventing overuse or misuse of natural resources.
4. Resource governance in MMSEA is characterized by the increasing decentralization of the state decision-making process and adaptive customary institutions at the village level; however, this has so far failed to give local communities adequate control over their resources. Rather than better access, there is increased public exclusion through the establishment of conservation areas for protection of biodiversity and watersheds, as well as the privatization of public resources (eg forests and land) to individuals, corporations, and companies. This exclusion is also reflected in the double standards that require complex management plans from local communities, while large-scale commercial interests are often granted unfettered access to resources. On the other hand, when given the opportunity, both local governments and people have been able to demonstrate their capacity and initiative in resource management in response to the market economy and cross-border trade liberalization.
5. Local land use decisions, both by smallholder farmers and large-scale plantations, are increasingly driven by globalization (for example, increasing Chinese demand in natural rubber affected other parts of MMSEA, resulting in large-scale rubber plantation in the uplands of Laos). Social connectivity through migration, trade, and other social networks is being accelerated today through free-trade agreements and economic integration in the GMS region.
6. The impacts of land use and land cover on ecosystem functioning, such as hydrological

FIGURE 3 Changes in species diversity with agricultural development.



cycles and sediment transport, are inversely related to the spatial scale. In contrast, the impacts of land use changes on water quality parameters may be relevant at the higher meso and macro scales. It is also important to note that the impact of these land use changes is temporally variable. While river and lake quality can be restored in a relatively short time, biodiversity will take thousands of years to recover.

7. Mobility and flexibility are often critical to sustainable land use. Long-fallow, rotational shifting cultivation is one well-documented example of how mobility and flexibility underpin the sustainability of extensive smallholder systems; if these attributes are lost, such systems may collapse. Similarly, policies that support mobile lifestyles and flexible livelihood strategies can allow pastures to 'rest' seasonally and thus curb degradation.
8. 'Think globally and act locally' applies to land use policy. Decentralized natural resource management such as community forestry, integrated watershed management, good practices of customary institutions, and application of traditional ecological knowledge can accelerate land use transition. The effectiveness with which land use science communicates

results at the grassroots level is of critical importance. One powerful tool for involving actors in sustainable land use is participatory land use planning.

9. Land use is at the center of trade-offs between ecosystem goods and services. Changes in land use often increase the share of energy, water, and nutrients devoted to human needs, but decrease the resources available for other ecosystem functions. Land use that balances poverty reduction and environmental conservation is rare. The emerging conservation paradigm includes the concept of payment for environmental services (PES), in which local landholders and users are rewarded for adopting land use practices that secure ecosystem functioning by direct payment from external environmental services beneficiaries.
10. For land use transitions, sound knowledge transfer among different stakeholders enables them to better understand the dynamics of land use/cover change, its links to ecosystem functioning, and the available policy options and interventions. Decentralized institutions and local communities are playing an increasingly important role in managing land use transitions.
11. MMSEA forest landscapes are the result of many generations of interaction between humans and ecosystems. Indigenous farmers manage deforestation in sequential agroforestry systems that integrate secondary vegetation, which provide not only diverse products for local people, but also habitats for endangered species. Recent trends suggest that most upland areas of MMSEA will eventually see a major change in land use with conversion from swidden agriculture to commercial crops and a change in land cover from secondary vegetation to permanent monocultural agriculture, albeit tree crops in many cases. Permanent agriculture could result in a tree-dominated land cover (eg rubber, fruit trees, tea), or a land cover composed of annuals (eg vegetables, sugarcane, maize, cassava, upland rice). In either case, biodiversity would probably decline (Nagata et al 1996; Figure 3).
12. Rapid economic growth and urbanization in China have not only increased demands on forest resources but also provide an opportunity to move rural farmers to non-farm jobs. In this sequence of events, forests would not decline further because shortages of agricultural workers would prevent further agricultural expansion. Moreover, rising farm labor prices discourage further intensive use of marginal lands such as forests. Growing economic power also enables government to compensate farmers to protect forests in the headwaters of river basins; however, this can increase timber imports and promote deforestation in the other parts of MMSEA (eg Myanmar). Opening cross-border trade and regionalization can be a double-edged sword for smallholder farmers in the MMSEA region. There is increasing opportunity for upland farmers from South-east Asian countries to send non-timber forest products to

huge Chinese markets, but they also have to risk competition in the temperate fruit market from Chinese farmers; these used to be 'niche' products produced by upland farmers in northern Vietnam, Laos, and Thailand.

Managing land use transition: from theory to practice

Land use change science and its policy applications include land use/cover change assessment, and forecasting based on the views of different stakeholders, including non-scientific people. Increasingly, non-state actors such as NGOs and civil society are shaping government policies. Successful links between land use science and policy require action-oriented research that involves all stakeholders. Different actors' points of view vary with their knowledge systems, objectives, and incentives in land use decisions; these different perspectives often create a cultural gap hindering the use of research findings. In the case of shifting cultivation, for example, the common perception held by policy-makers attributes deforestation to a rapidly growing population of poor shifting cultivators who are hungry for new land, while another view, often held by scientists, blames corporate greed.

Policy-makers must understand land use to address pressing policy issues. Some policies directly affect land use (eg policies that create protected areas) or land-based activities such as agriculture or forestry. Other policies, not intended to affect land use, can have profound but indirect impacts. These include trade, sector, and public investment in infrastructure, and macroeconomic policies. For example, China's soaring rubber demand (imports rose 550% in the 20 years up to 2002) was serviced mainly from Southeast Asia. This rubber plantation expansion causes widespread deforestation and conversion of secondary vegetation into monocultures in MMSEA.

Although we often focus on the negative environmental impacts of increasing globalization, marketization and modernization, these changes can have positive effects. International migration and the remittance economy provide US\$ 43 billion for Eastern, South-east and Pacific Asia (World Bank 2005). This external income promotes small enterprises in the original communities, such as family-based tourism, which further reduces pressure on uplands in MMSEA. Moreover, labor-intensive technological progress such as new irrigation techniques can intensify use of existing agricultural areas and increase rural incomes through double cropping or vegetable cultivation in dry seasons. These increases in productivity help reduce land clearing, therefore conserving forest cover on marginal land.

In rare cases, land use transition may help reduce poverty and conserve nature. Where it is commercially viable, ecotourism is one such 'win-win.' Matsutake (*Tricholoma matsutake*) collecting is another win-win situation. Increasing demand for these mushrooms has encouraged Tibetan collectors to shift from logging to mushroom harvesting, reviving customary institutions that manage forest resources and regulate access to mushroom habitats (ie oak and pine forest). Another positive outcome is the improved management of traditional agriculture by the Hani (Akha) people in Xishuangbanna to incorporate marketable products such as rattan and tea in swidden and natural forest (Xu 2005).

Conclusions

The Mobile Workshop reinforced the notion that land use change science must be more inclusive and have greater impact on policy and public debates. During the course of the workshop we saw the effects of recent transitions, both positive and negative, on local communities and ecosystems. It was particularly

instructive to view these changes through each of the 3 thematic groups: land use change, livelihoods, and governance. Quantifying changes is vital (land use change), but we must be cognizant of the socioeconomic effects of these changes on the ground (livelihoods), together with a long-term view of the sustainability and equity of such changes (governance). Bringing people together, particularly younger researchers from diverse disciplines and cultures, helps build a better appreciation of the need to have a multi-prong approach to land use science. When viewed holistically, preconceived notions—such as: swidden agriculture is destructive, cash cropping builds wealth, more forest gets more water, or afforestation benefits biodiversity—were shown to be generalizations that are not applicable in many systems or communities.

It is also important that we understand the power of land use science and the need to use it responsibly. Land use is often a political decision, and science is present as a political voice in land use decisions at local, national, and international levels. Science must be made accessible to land users and policy-makers, and accompanied by an appreciation of specific local viewpoints and knowledge systems. Moreover, there is need for long-term and proactive thinking. Improving forest cover and agricultural yields is fine, but this must also be matched with increasingly sophisticated ecological, marketing, and socioeconomic analyses, to ensure the viability and sustainability of such improvements. Finally, land use science must constantly reassess and review changes: land use transitions to improve incomes are highly desirable but these must be balanced against environmental quality and the sustainability of ecosystem services. An understanding of the strengths and limitations of land use science will enable constructive input to responsive policy-making.

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Tai Valley-based Politics and the Uplands in Montane Southeast Asia

The domains of earlier Tai muangs—the social spaces governed by various Tai groups—in the highlands of montane Southeast Asia frequently incorporated both upland valleys and the flanking, sloping lands used by various Tai

and non-Tai groups. The articulation of the land uses and livelihood activities of these two landscapes of the muangs served to reproduce these Tai polities. The ideas and actions of both the ruling Tai groups and the subaltern upland

groups contributed to the construction of the highland muangs that typically incorporated status differences, ethnic diversity, and ecological variety. Muang polities achieved governance of both a diverse network of peoples and a diverse