Lao People's Democratic Republic: Policy, Market, and Agriculture Transition in the Northern Uplands

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ACRONYMS AND ABBREVIATIONS

ACMECS	Ayerwaddi-Chao Phraya-Mekong Economic Cooperation Strategy
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CAFTA	China-ASEAN Free Trade Agreement
CO_2	Carbon dioxide
DAFEO	District Agricultural and Forestry Extension Office
DAFO	District Agriculture and Forestry Office
DMC	Direct seeding, mulch-based conservation
GDP	Gross domestic product
GMS	Greater Mekong Subregion
GWP	Global warming potential
ha	Hectare
HDI	Human Development Index
LECS	Lao Expenditures and Consumption Survey
LFAP	Land and Forest Allocation Program
MAF	Ministry of Agriculture and Forestry (Lao PDR)
NAFRI	National Agriculture and Forestry Research Institute
NAFTA	North America Free Trade Agreement
NSDEP	National Socio-Economic Development Plan
NTFP	Non-timber forest product
PAFO	Provincial Agriculture and Forestry Office
TIG	Trade in Goods (Agreement)
UNESCO	United Nations Educational, Scientific, and Cultural Organization
WTO	World Trade Organization

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EXECUTIVE SUMMARY

The Northern Uplands of Lao People's Democratic Republic (PDR), comprising the provinces of Phong Saly, Luang Namtha, Bokeo, Houa Phan, Xieng Khouang, Oudomxay, Xayabury, Luang Prabang, and northern Vientiane, remains one of the lagging regions in mainland Southeast Asia. The Northern Uplands is nearly exclusively agriculture based with almost 90 percent of rural households involved for most of their time in crop and livestock production. The structural transformation from subsistence to commercial agriculture, integration of markets, and development of the rural non-farming sector are only slowly taking place.

During the mid-1990s to the mid-2000s, rural poverty in the Northern Uplands declined steadily and significantly. This reduction was primarily driven by strong agricultural growth and productivity gains combined with improving road linkages. The Northern Uplands, however, remains one of the poorest regions in Lao PDR with a poverty headcount above 40 percent or more than 800,000 people—about half of all people living in poverty in Lao PDR. Out of 72 nationally designated poverty districts, 47 are located in the Northern Uplands; and of that subtotal, 32 are identified as priority poverty districts. Poverty incidence and severity remain much higher among the various ethnic groups who make up approximately two-thirds of the Northern Uplands population. At the same time, agriculture contribution to overall gross domestic product (GDP) is declining. In 2005/06 it accounted for about 40 percent as compared to more than 50 percent in 2001. Slowing agricultural growth is leaving an increasingly smaller share of national income to the majority of the Lao population, which remains dependent on agriculture.

The Northern Uplands has long been subject to the Government's determination to transform the upland economy and social structure toward a modern and unified socialist society. To this end, a set of upland policies have been established that have noticeably advanced the transition from traditional forest-based swidden agriculture and livelihood systems toward sedentary and intensive agriculture and commercialization. Among these policies are the Land and Forest Allocation Program, the Stabilization of Shifting Cultivation Policy, the Opium Eradication Program, and the Village Cluster Development Program. Each of these programs, as well as other agriculture commercialization policies, has progressed considerably over the past years. Simultaneously, the Northern Uplands has been exposed to regional growth dynamics, particularly from China, Thailand, and Vietnam, which have gained a strong momentum particularly during the past several years. As Lao PDR is further developing its economic and trade relations and transport linkages with its neighbors, the Northern Uplands will increasingly supply agriculture products to its neighbors to which it also serves as a land and production resource base.

The combination of upland policies and regional market forces is driving a transition from traditional livelihood systems to new agriculture production models as well as changes in agricultural crop composition away from traditional upland rice toward a

variety of cash crops and increasing numbers of livestock. In 2008, the area under traditional forest-based swidden cultivation practices is estimated to account only for 20-30 percent of total cultivated area in the Northern Uplands while about 70-80 percent of all farming areas are in a state of transition. More specifically, a number of non-traditional, new production systems can be identified across the Northern Uplands that have emerged and are evolving in response to those market dynamics and policy implementation.

Emerging agricultural production systems

Fixed rotational cropping is developing as the most widespread, non-traditional production system across the Northern Uplands. It is still characterized by subsistence production of upland rice on large areas but numerous cash crops (including maize, cassava, Job's Tears, ginger, sesame, beans, etc.) are being increasingly introduced into this system. Fixed rotational cropping has emerged in response to land allocation and fallow access restrictions in traditional swidden systems. As a consequence of fixed permanent cropping and, in particular, the elimination of fallow periods, natural soil fertility is decreasing and, in the medium term, farm yields are likely to decline and soil erosion is likely to increase.

Modernized rice-based farming is based on supplemental irrigation during wet and dry seasons and is increasingly replacing the traditional wet seasonal rice cropping. This system includes mechanized plowing, high-yielding varieties, and the use of mineral fertilizers and pesticides. While irrigation areas are expanding, the total area of this production system remains small.

Annual cash cropping in large-scale monocultures , particularly the mono-cropping of maize, is emerging in many areas and replacing upland rice and, in some cases, even paddy rice. The maize production area has nearly tripled over the past decade from a recorded area of 23,000 hectares (1995) to more than 66,000 hectares (2005). The Northern Uplands accounts for 75 percent of the increase in production area in Lao PDR, most of which occurred since 2002. Maize is now primarily being produced for export to China, Thailand, and Vietnam. Annual (maize) cash cropping involves the use of hybrid varieties, fertilizer and pesticides, the burning of crop residues for land preparation, and plowing on steep slopes. Cash cropping is also beginning to encroach on young regenerating forests and on (degraded) natural forests.

Industrial plantations of tree crops, mainly rubber, teak, and eucalyptus, are becoming common across the Northern Uplands. Rubber plantations have already been established on more than 40,000 hectares and with about 120,000 hectares being targeted for planting. An important implication of rubber plantation development for upland livelihood security is that rubber plantations are competing for land with traditional food crops. Rubber plantations, although only being authorized on bare and fallow land, are also increasingly encroaching into existing natural forest areas.

Intensified production of livestock is a relatively recent trend observable across the Northern Uplands and characterized by locally concentrated large numbers of ruminant livestock, uncontrolled forest grazing, foraging with limited supervision, deliberate and repeated use of fire in forest areas to induce growth of fresh grasses, and poor and insufficient pasture management. About 87 percent of rural households in the Northern Uplands engage in large livestock production, of which about 38 percent sell livestock.

Regional Market Dynamics and Impacts

Cross-border trade has become a critical factor in economic development in the Northern Uplands since about 2003. Regional and domestic traders and agri-businesses are taking increasing advantage of the strategic position of the Northern Uplands as an important production base for agricultural products in demand by the expanding markets in China, Thailand, and Vietnam and are sourcing food crops, agricultural raw materials, livestock, and non-timber forest products, and other niche products. Besides the progress made in recent years in improving transport and communication infrastructure, free trade agreements among Greater Mekong Subregion (GMS) member countries and bilateral and multilateral trade and investment initiatives launched by China, Thailand, and Vietnam are beginning to shape the environment for private sector commercial activities in the Northern Uplands. Among these are the Ayerwaddi-Chao Phraya-Mekong Economic Cooperation Strategy (ACMECS); the China-ASEAN Trade in Goods (TIG) Agreement, and ongoing customs reforms and harmonization of trade regulations within the Greater Mekong Subregion. A reflection of this greater integration is the emergence of a variety of cross-border contract farming arrangements and land concessions.

Government policy encourages private initiatives, including those by foreign investors from neighboring countries to promote contract farming, especially in horticulture and tree crops. However, in the absence of a regulatory framework, the provinces and districts are required to be innovative in their dealings with domestic and foreign investors interested in contractual arrangements. A number of contract farming models have been tested with a mixture of results and only a few models have emerged that merit further consideration as standard practice that might meet the needs of local farmers, commercial enterprises, and local authorities. However, the distribution of benefits, which are generated under these arrangements, is presently not well documented or understood. The longer-term implications for poverty alleviation, especially for disadvantaged groups, the environment, and issues such as migration, are generally unclear and require further research.

Transition Outcomes

With significant progress in implementing the upland policy framework, as well as progress in regional integration, swidden practices have been giving way to new permanent agriculture and other land uses, which are still evolving. Upland farmers have responded with different coping strategies to accommodate the restrictions posed by existing policies and, where possible, have simultaneously responded to opportunities brought about by regional market demand. As the uplands transition progresses, the transition outcomes are coming into clearer focus.

The two main coping strategies adopted by upland farmers across the Northern Uplands include the introduction of annual and perennial cash crops into previous upland rice farming systems and, often simultaneously, the intensified production of large ruminants. These strategies have resulted in the accelerated and permanent conversion of previous fallow land and young secondary forests into permanent cropping and grazing land. Also in response to the upland policies, farmers have shortened or abandoned fallow and regeneration periods on agriculture land and intensified cropping on smaller areas concentrated around settlements with the

common result that areas now under permanent cultivation show signs of soil degradation and declining yields. Field observations indicate that the intensification of annual cash cropping, the expansion of industrial tree plantations, and intensified livestock production are generally not reducing pressure on the upland environment; and the intended introduction of sustainable land use practices, following the elimination of swidden agriculture, is not happening. In fact, the shift from previously extensive agro-forestry land use patterns to intensive permanent agriculture on sloping lands raises concerns about land degradation and sustainability in the longer term.

The current upland and agriculture policy framework, which in this study is represented by the 4 Goals and 13 Measures of the Ministry of Agriculture and Forestry, is promoting agriculture commercialization and market integration while its broader upland and rural development-related elements have primarily restricting effects on upland communities and their livelihood strategies. The success of promoting commercial agriculture primarily therefore depends primarily on the strength of the market pull factor, which is a function of access to market infrastructure. The stronger this market pull, the less restrictive is the policy framework—reflecting an inherent contradiction in the policies that remote upland farmers face more restrictions with regard to their livelihood opportunities and transition options while only those farmer households with market access tend to benefit from the policies. A key conclusion is that the current policy framework in its implementation is not sufficiently sensitive to those of the Lao society who live in remote areas with limited market access and few alternatives for ensuring food security and generating income other than traditional swidden agriculture.

In this context, it is important for Government and other stakeholders to gain a better understanding of the types of households that tend to gain and lose in the transition process. In the uplands, natural capital and assets of households are mainly determined by the policy framework. The Land and Forest Allocation Program tends to decrease access to land, the Stabilization of Shifting Cultivation Policy tends to reduce long-term quality of crop land and requires the shift to new production models that are unfamiliar to upland farmers, and the Village Cluster Development may lead to changes in the size of land holdings and land tenure and insecurity. Households, which are characterized by stable access to and sufficient quality of land combined with secure tenure and good access to infrastructure, are likely to benefit in the transition to a market-oriented agriculture sector. Those households that experience restrictions in land access, reduced quality of land, and increasing insecurity of tenure combined with poor access to infrastructure are likely to lose in the transition simply because they are lacking market opportunities to cope with restrictions by the policies. And finally, households that are currently not being reached by either policies or infrastructure are likely to continue upland swidden agriculture with little changes on livelihood security.

And finally, while the Northern Uplands remains an ecologically and relatively intact region as compared to neighboring countries, new landscape-level trends are emerging that indicate the uplands ecosystems and natural landscapes are becoming less resilient and more vulnerable as a result of the transformation process. These impacts include farming soil degradation in the areas of intensive maize-growing and fixed rotational cropping, particularly in the absence of sensible crop rotations and organic fertilization; land and forest degradation through overgrazing and transition to fire-driven grassland landscapes; and the transformation of secondary natural forests into industrial tree plantations.

Support Options for Managing the Uplands Transition

There are four key areas for supporting a successful transitional framework in the Northern Uplands.

Promoting targeted integrated rural development approaches. There is a strong rationale for public intervention to provide disadvantaged communities in poor and marginal environments with livelihood support in the form of demand-driven integrated rural development approaches. The Northern Uplands is becoming increasingly heterogeneous in the course of the transition, with some areas advancing and others being left behind. While investments in single assets, such as road infrastructure or rural electrification remain critically important for regional integration and commercialization, these investments need to be complemented by geographically targeted and integrated support for rural livelihood development in marginal areas. This would include support for small-scale, community-based rural infrastructure; agricultural technologies that are adapted to livelihood needs but also to changing production and market conditions; health and sanitation; and education to build and improve household assets and enable upland communities to better participate in the transition. With regard to the emerging production systems, tailored support in new production technologies for fixed rotational cropping, upland and intensified rice cultivation, cash cropping, and livestock raising should be provided, particularly through investments that promote the adoption of sustainable production and grazing practices; improve the delivery of livestock services, and strengthen local institutional development and marketing support.

Enhancing the policy framework. A careful and open policy assessment of whether the underlying assumptions with regard to traditional farming practices, upland environmental degradation, and upland poverty are adequate and relevant would be an important step toward making the upland and agriculture policy framework less restrictive for upland livelihoods and more pro-poor sensitive. A useful assessment should build on evidence and local experiences with traditional land use practices and their livelihood and food security benefits, socio-cultural and ethnic conditions, and ecological appropriateness in the upland environment of Lao PDR.

A revised upland and agriculture policy framework would distinguish between the different levels of intervention. On the one hand, policy interventions could be tailored to location-specific characteristics; for example, in places where market opportunities are not available, upland communities should not be subjected to the same extent of land use restrictions as those that have opportunities for alternative income generation outside traditional agricultural practices. This would require a more careful and flexible sequencing of policy implementation, especially in the case of the Land and Forest Allocation Program and the Stabilization of Shifting Cultivation Policy. On the other hand, policies could be formulated in ways that distinguish between individual production systems, market access conditions, and remoteness level of upland communities as well as market participants. Policies should not only focus on smallholder producers but also include private commercial investors if overall poverty reduction and rural development objectives are to be achieved.

Defining the role of government in the transition. The role of government in the upland agricultural development process is likely to become increasingly more important in light of the more complex nature of the market. Prior to the 6th and 7th

Party Congresses, agricultural development focused on national and local food security and meeting the immediate needs of the Lao people. The market was clearly identified as a domestic market. Subsequent to adoption of market-oriented policies, followed by trade liberalization and regional integration, producers began to respond to market signals from different sources, mostly outside of Lao PDR. It is in this context that the Government should redefine its role from one of being a central planner to one of being a facilitator, monitor, and guide. Defining the 4 Goals and 13 Measures and the individual agriculture-related programs in more detail could help to develop a better sense of the public and private sector elements in this policy framework as well as the potential fiscal implications and funding needs.

Managing environmental outcomes. Managing the environmental outcomes of the transition process requires Government attention. Four areas stand out: impact of intensified livestock development, cash crop monocultures, large-scale rubber plantation development, and community-based resource management. These can be addressed in the context of integrated watershed management as well as through further promotion of existing participatory research and extension approaches. Avoiding negative long-term impacts on the environment would also require improving enforcement of existing regulations on such technologies as direct seeding, mulch-based conservation agriculture, tractor plowing, and forest protection combined with investment efforts to scale-up such proven technologies. Community management of natural forests resources, especially the sustainable production of valuable timber, has a good potential for development of the Northern Uplands in an environmentally sound way.

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I. INTRODUCTION

The Northern Uplands of Lao People's Democratic Republic (PDR) comprises the provinces of Phong Saly, Luang Namtha, Bokeo, Houa Phan, Xieng Khouang Oudomxay, Xayabury, Luang Prabang, and northern Vientiane. While each province in the Northern Uplands is highly diverse in itself, the Northern Uplands—for a number of reasons—stands out as a region of common characteristics and trends that emerge as a significant development challenge to the Government of Lao PDR and its donor partners and therefore merits an assessment and discussion in its own right. The Northern Uplands provinces account for about 60 percent of the country's total land area and for approximately half of its rural population. They are characterized by a complex topography of mountains, hills, and flatland areas; an ethnically highly diverse population; comparatively low population densities; a long history of political tension and instability; an incomplete state of public infrastructure; low levels of basic education and health care; and—at least until recently—an overwhelming reliance on a range of traditional swidden agriculture systems and forest use practices.

Agriculture, poverty, and economy in the uplands. The Northern Uplands remains one of the lagging regions in mainland Southeast Asia where the structural transformation from subsistence to commercial agriculture, integration of markets, and development of the rural non-farming sector are only slowly taking place. The Northern Uplands is nearly exclusively agriculture based with almost 90 percent of rural households involved for most of their time in crop and livestock production. Less than half of the rural households are selling agriculture produce, and engagement in non-farm business enterprises remains very limited. At the same time, agriculture contribution to overall gross domestic product (GDP) is declining and in 2005/06 accounts for about 40 percent as compared to more than 50 percent in 2001. Slow agricultural growth is leaving an increasingly smaller share of national income to the majority of the Lao population, which remains dependent on agriculture.

The Northern Uplands remains one of the poorest regions in Lao PDR. Out of 72 nationally designated poverty districts, 47 are located in the Northern Uplands; and of that subtotal, 32 are identified as priority poverty districts. During 1993-2003, rural poverty in the Northern Uplands declined steadily and significantly; this decline was closely associated with strong agricultural growth and productivity gains, which also benefited the poorest segments of the rural population.[1] By the mid-2000s, rural poverty population still remained at above 40 percent or more than 800,000 people—about half of all people living in poverty in Lao PDR. Poverty incidence and severity, based on consumption indicators, remain much higher among the various ethnic groups who make up approximately two-thirds of the Northern Uplands population. The Participatory Poverty Assessment (Chamberlain 2007) indicates that many of the rapid and unprecedented changes in livelihood and production practices

[1] Based on the Lao Expenditures and Consumption Surveys (LECS) of 1992/3, 1997/8 and 2002/3.

and unfamiliar customs brought from outside the tradition are in fact causing hardships. And, not to be overlooked, food security remains a pressing issue.

The Northern Uplands is centrally located between China, Vietnam, and Thailand and exposed to external economic growth dynamics that have also gained a strong momentum during the past few years. As Lao PDR is developing its economic and trade relations and transport linkages with its neighbors, the Northern Uplands increasingly supplies agriculture products to its neighbors to which it also serves as a land and production resource base. The accelerating influence of regional market forces leads to increases in permanent intensive agriculture and changes in crop composition away from traditional upland rice cultivation to such cash crops as maize, sugar cane, soy bean, and Job's tears; and to increasing numbers of livestock. Frequent changes in the production areas of individual crops across the provinces indicate that farmers are experimenting with different crops in response to emerging market signals and fluctuating prices. Annex A shows the areas of production change in the Northern Uplands between 1995 and 2005 with a clear decrease in upland rice and an increase in all other cash crops.

Transitioning from swidden agriculture- to market-based development. The Northern Uplands is not however only exposed to market forces but also constitutes a policy-driven environment. It has long been subject to the determination of the Government to fundamentally transform its economy and social structure toward a modern and unified socialist society. To achieve this end, the Government has instituted a set of upland and agriculture policies that have noticeably advanced the transition from traditional forest-based swidden agriculture and livelihood systems toward sedentary and intensive specialized agriculture, commercialization, non-agricultural occupation, and off-farm income development. The Land and Forest Allocation Program is one key policy initiative that aims at demarcating clear boundaries between agriculture and forestry land use and replacing customary with statutory land use rights. Another Government initiative, the Stabilization of Shifting Cultivation Policy, seeks to halt swidden agriculture by 2010. The Opium Eradication Program hopes to eliminate this cash crop from the importance it has held in rural household incomes for over 150 years. The Village Cluster (*Koum Baan*) Development Program aims at concentrating scattered upland communities in village clusters for improved public service delivery, infrastructure provision, and administrative support. Each of these programs and other agriculture commercialization policies has progressed considerably over the past years. This progress brings policy outcomes and emerging gaps into clearer focus.

In this policy context, traditional swidden agriculture has been singled out as the main cause of poverty and slow economic development because it is seen to be primarily subsistence oriented with little surplus produced for the intended commercialization. Swidden agriculture has also been identified as the main driver of upland environmental degradation, but in fact such other land use priorities as commercial logging, land conversion for industrial plantation and commercial agriculture development, mining, and hydropower development—which are competing with swidden agriculture for land—are of more obvious concern with regard to environmental degradation.

Policy and markets are driving transition to new production models. The combination of upland policies and market forces is driving the transition from traditional livelihood systems to new production models and the development for

coping strategies of upland communities for livelihood security. The push and pull forces at times mutually reinforce and positively influence the transition but often can also contradict and restrict upland farmers' livelihood choices. They are also often accompanied by unintended side effects. The transition shows two principal trajectories. In more remote areas, where market opportunities are scarce or not available at all, traditional farming patterns are being transformed, nearly exclusively in response to Government policy goals, often creating significant hardships and food insecurity for the communities. In these cases, new resource boundaries are too restrictive and do not take the livelihood needs, limitations of production capacities, and knowledge of upland communities into account. At the same time, policies do not acknowledge the importance of traditional livelihood systems for institutional stability as well as their contribution to ecological and production sustainability. Instead, livelihood traditions appear to be rapidly abandoned without having an alternative arrangement identified that could take its place. Contrastingly, in areas where markets have emerged along with improved infrastructure and demand for specific crops and marketing opportunities are driving farmers' production decisions, it appears that upland farmers are benefiting from this market demand and the current policy framework becomes less restrictive. However, some new challenges and policy gaps become apparent, for example, with regard to balancing investments in public and private goods, identifying appropriate land use and tenure arrangements, and governing private sector agri-business development.

In this new market environment, a facilitating role for Government needs to be defined that can better support small-holders in the transition toward commercialization and market integration. The most challenging task resulting from the uplands transitions is how to promote small-holder agriculture in sustainable ways, which helps to maintain upland livelihood and food security and, at the same time, leads to growth in the rural farm and non-farm sectors for broad-based poverty reduction.

Objective and structure of this report. The transition in the Northern Uplands provides a timely opportunity to engage with the Government of Lao PDR in a dialogue on a framework for upland agriculture and livelihoods. This report *Lao People's Democratic Republic: Policy, Market, and Agriculture Transition in the Northern Uplands* aims to contribute to such a dialogue by providing (a) a policy-relevant typology of the structural characteristics and transition patterns of the principal small-holder agriculture systems in the Northern Uplands and (b) recommendations to strengthen Government's facilitation of a more sustainable and equitable upland transition. The report also provides input into the ongoing dialogue under the umbrella of the joint Government-Donor Working Group on Uplands.

Resulting from a successful cooperation of the Ministry of Agriculture and Forestry (MAF), *Agence de Développement de France* (AFD), and the World Bank, the report findings are based on joint field missions and extensive discussions with provincial- and district-level authorities in all provinces of the Northern Uplands. The report also builds upon and complements recent analytical work of the World Bank and other donors, including the Lao PDR Poverty Assessment Report 2006, Rural Issues Paper 2006, and Poverty and Social Impact Assessment 2008 (forthcoming). The report does not attempt to be an exhaustive treatment of the uplands development agenda. It does seek to emphasize some new and fast-evolving aspects of the uplands, particularly with regard to agriculture development and natural resource management, in a broader policy dialogue context.

Following this introduction, Chapter II sets out a typology of traditional and emerging agriculture production systems in the Northern Uplands as a starting point of the report. Chapter III summarizes the Government's upland and agriculture development-related policy framework, and Chapter IV provides an overview of the market impacts currently at work in the Northern Uplands. Chapter V discusses the transition dynamics and pathways of individual agricultural production systems and outcomes. It also includes some considerations on the winners and losers in the upland transition and on the sustainability within the emerging production patterns. Chapter VI concludes with recommended options for policy adjustments and support interventions to help facilitate the transition process.

II. TYPOLOGY OF NORTHERN UPLANDS AGRICULTURE PRODUCTION SYSTEMS

Classification of agricultural systems, particularly swidden agriculture systems, which have been the most common land use system in the Northern Uplands in the past, is complex as the subject of the classification is diverse and systems are in many cases difficult to compare. It can be based on a variety of criteria, such as culturally traditional or integral versus non-integral; new or partial systems depending on whether farmers are indigenous people or new settlers; duration of cultivation and fallow periods; sedentary versus migratory cultivation patterns; impacts of cultivation on vegetation; and geographical and local characteristics. For Lao PDR, van Gansberghe (2005) used the categories of rotational versus pioneering; forest fallow versus savannah fallow; and integral versus partial swiddeners to classify upland farming systems. Typologies that have been used to describe systems in the neighboring countries are mainly based on cultivation and length of fallow periods and on settlement relocation patterns, for example, in Thailand (Karen Network for Culture and Environment, undated) and Yunnan Province (Yin Shaoting 2001). Other variables in many of these typologies include principle crops, crop associations and successions, crop-fallow time ratios, head of livestock, tools and techniques, vegetative cover of cleared land, climatic and edaphic conditions, land tenure system, level of integration into market economy, ethnic beliefs and traditions, level of conversion from swidden agriculture to sedentary agriculture (Conklin 1957; van Gansberghe 2005).

The typology of agricultural systems designated in this report does not take account of the full complexity of upland conditions and goes beyond traditional swidden systems. It differentiates production systems more broadly on the basis of use of land available to the household. It identifies two traditional (Group I and II) and six emerging systems (Groups III through VIII) and thereby aims at capturing the main transition trends as basis for a policy-oriented discussion of the transformation of livelihoods. The typology, summarized in Table 1 at end of section A, is based on field observations and discussion results with provincial authorities.

A. Traditional Agriculture Systems

Group I – Traditional swidden agriculture. Forest-based swidden agriculture is usually integrated into a diverse land use system that includes permanent fields for certain crops in the fallow areas, home gardening, animal husbandry, and paddy rice cultivation in river valleys where land is available. Swidden agriculture practiced by indigenous users can be differentiated along initial vegetation cover, type of final vegetative cover remaining after users shifted to other parcels, and length of the fallow (forest re-growth) period (Fujisaka and others 1996). These criteria emphasize the forest-based nature of this type of agriculture and the importance of forest uses such as non-timber forest products (NTFPs) and hunting.[2] Swidden agriculture can be divided into 3 subsystems:

[2] See Annex B for a brief background discussion of the academic and policy debate of swidden agriculture systems.

- ***Natural forest and medium fallow lengths (5-10 years toward young secondary forest.*** This subsystem describes the most common form of traditional swidden agriculture, which is still practiced by indigenous communities of the various ethnic groups across the Northern Uplands. It is characterized by the dominant production of upland rice intercropped with many other side crops (tubers, beans, fruits); importance of NTFP collection for subsistence needs in times of rice shortages; hunting; animal husbandry (pigs, poultry); and the near absence of paddy fields. Cultivation practices are often characterized by the use of hand tools and the absence of pesticide and herbicide use. The final vegetation cover of the swidden plots is natural forest vegetation, which is quickly and profusely regenerating in absence of larger populations of ruminant livestock. The medium fallow length ensures restoration of soil fertility maintaining stable yields; any kind of fallow improvements are uncommon. The increasing clearing of young secondary forest, apparent in many locations, however, reflects the growing scarcity of mature secondary forest available for swidden agriculture.
- ***Natural forest and long fallow length (greater than 10 years) toward mature secondary forest***. This form of swidden agriculture is less common but still practiced by indigenous communities in Luang Namtha (e.g., Nam Ha Nature Reserve), Bokeo, and Phong Saly where low population density and large forest areas ensure availability of mature secondary forests for swidden agriculture. From their appearance and floristic composition, the mature secondary forests are comparable to primary forests; however, given the long history of swidden farming in this region, they are considered secondary nature. The main characteristics of this subsystem are similar to the ones described above, with minor differences in swidden plot size (smaller plots) and an even higher importance of NTFP collection and use.
- ***Mature secondary forest toward agro-forestry with no fallow period***. The conversion of mature secondary forests to agro-forests by individual indigenous users is a rare phenomenon in the Northern Uplands. Ducourtieux (2000) reports about 10,000 households participated in introducing cardamom (*Amomum sp*.) cultivation in Phong Saly within the framework of a rural development project. Since cardamom is a shade-tolerant species that requires a forest interior climate to grow, its cultivation eventually leads to agro-forests where a dense tree cover (about 70 percent of the original cover) remains.

In 2008, the area under traditional swidden cultivation practices is estimated to account for 20-30 percent of total cultivated area in the Northern Uplands while about 70-80 percent of all farming systems are in a state of transition showing response to market dynamics or upland policy implementation.[3] One of the obvious indicators is the decline in upland rice production, traditionally produced in swidden agriculture systems. Upland rice cultivation declined from an estimated 140,000 hectares in 1995 to less than 70,000 hectares in 2005. During the same period, wet season paddy rice cultivation expanded significantly. Production areas have nearly doubled during the past ten years and in 2005 accounted for two-thirds of the total rice production area in the Northern Uplands while upland rice only accounted for about one-third of the production area. However, more than 60 percent of all upland rice cultivation areas of

[3] Based on indicative figures of shifting cultivation reduction provided by the Provincial Agriculture and Forestry Offices of the 9 upland provinces.

Lao PDR are still found in the Northern Uplands.

Traditional swidden farming practices can still be found in very remote areas but are likely to be influenced within the next 3-5 years as market access increases due to improving infrastructure and implementation of the Shifting Cultivation Stabilization Policy progresses and reaches out to these areas. Figures from Phong Saly indicate a reduction of 70 percent (from 26,000 hectares down to 7,700 hectares) within the last 7 years.[4] Within the timeframe of one generation, traditional swidden systems that have shaped the Northern Uplands for centuries might disappear completely.

Group II – Rain fed, wet-season rice in valley bottoms. Traditional rain fed, wet-season rice cultivation and gravity-based irrigation of dry-season rice with indigenous varieties, with minimal use of chemical fertilizer and pesticides, and low levels of mechanization are found on small scale throughout the Northern Uplands. Overall extent of this system is small due to the limited suitable basin areas for this type of land use. Rice cultivation is part of a broader diverse land use system that often features elements such as home gardens, fish cultivation, raising of small livestock and buffalo, and NTFP collection, which is not only important for food security but also provides for construction material and for income (e.g., sericulture and apiculture).

B. Emerging Production Systems

Emerging production systems describe all non-traditional systems where either indigenous communities or colonists convert secondary natural forest and shrubland into permanent agricultural cropland, plantations, or grazing land/pastures. Colonists often include lowland farmers and private investors from neighboring countries who either rent state land or encroach on land of indigenous communities.

Group III – Fixed rotational cropping. Fixed rotational cropping is emerging as the dominant non-traditional agriculture production system throughout the Northern Uplands. It represents a 'stabilized' form of traditional swidden agriculture and is found on large areas on lower and middle slopes throughout the provinces. Fixed rotational cropping has emerged in response to the Land and Forest Allocation Program (LFAP) that introduced land zoning and allocation and fallow access restrictions into the traditional systems. Each family labor force is generally allotted 3 to 4 permanent plots. Of these, the household is supposed to cultivate only 1 or 2 plots per year and allow for at least a 2- to 3-year fallow or rotation period. Contrary to the original intention, farmers often use all their allocated plots at the same time. Declining yields on one hand and market opportunities on the other have contributed to the virtual elimination of the fallow period with negative impacts on soil fertility (in the absence of mineral fertilizer) accompanied by increased soil erosion as compared to traditional swidden agriculture. Fixed rotational cropping is still characterized by subsistence production and based primarily on upland rice but cash crops (including maize, cassava, Job's tears, ginger, sesame, beans, and pigeon pea) are being increasingly introduced by farmers on small scale. Reduced or absent fallow periods have on average also caused higher weed infestation and insect and crop disease problems and led to higher labor requirements for weeding and, albeit still sporadic, application of pesticides.

[4] Similar reductions are observed in: Xayabury, Kenthao District, 92 percent reduction; Luang Namtha, Vieng Phouka District, 67 percent reduction; Oudomxay, Muang Hun District, 45 percent reduction.

Group IV – Modernized rice-based farming. Modernized rice-based farming represents a recent development in the wet-season, rice-based traditional farming system described in Group II. The new system is characterized by wet and dry season rice cultivation with mechanized plowing, high-yielding varieties, more intensive use of mineral fertilizer and pesticides, and supplementary irrigation schemes (pumps, channels). Irrigated dry season rice cultivation has been expanded to about 5,400 hectares across the Northern Uplands. Dry-season rice is however increasingly being replaced by cash crops (e.g., watermelon, maize, and chili). Since the system is modernizing, it often expands to larger plots as compared to its traditional form and as farmers are beginning to specialize, other land use elements of the traditional form are disappearing.

Group V – Annual cash cropping in mono-cultures. Annual cash cropping in large-scale monocultures is emerging in many areas and increasingly replacing upland rice and in some cases even paddy rice (e.g., in Meung Kham District and Beng District). Cash-cropping is also beginning to encroach on young regenerating forest and on (degraded) natural forest areas. Dominant crops in this system include maize; Job's tears; sugarcane; and, to a lesser extent, rice bean (*Vigna umbellata*), black cowpea (*Vigna unguiculata*), peanuts, and sesame. Annual cash cropping generally involves the use of hybrid varieties; fertilizer and pesticides; the burning of crop residues for land preparation; and plowing on steep slopes (even mechanical plowing with tractors in southern Xayabury).

As the most prominent of the new crops, maize production area has expanded nearly threefold over the past decade from a recorded area of 23,000 hectares (1995) to more than 66,000 hectares (2005). The Northern Uplands accounts for 75 percent of the increase in production area in Lao PDR, most of which occurred since 2002. Provincial data shows that this expansion has further accelerated and some provinces have seen a doubling in maize production area since 2005, with Xayabury, Oudomxay, and Bokeo having seen the most dramatic increases in production area. Farmers in Northern Uplands produced an estimated 297,500 tons of maize in 2005, compared to only 55,000 tons in 2002. In 2006, Xayabury Province alone produced an estimated 147,000 tons. Maize is primarily being exported to Thailand, China, and Vietnam but also sold locally to domestic livestock feed mills operating in Bokeo (Houay Xai), Luang Namtha (Namtha), and Houa Phan (Xam Nua) Provinces.[5]

Many farmers who have adopted cash cropping are unfamiliar with the required agricultural techniques. By applying cultivation practices inappropriately, in particular the application of pesticides,[6] and by recurrently cultivating the same plots with maize with no supplemental fertilizer application or crop rotation with legumes, they are promoting increased soil degradation and nutrient loss and are unlikely to maintain the current high yields.[7]

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[5] Maize yields are reported to be in the range of 5 to 9 tons per hectare per year. Production costs are high (on average US$175 per hectare) because of high input cost for plowing, seed purchase, and chemical weeding. Returns to labor are reported to be in the range of US$2.25 per day.

[6] Paraquat and Atrazine, which are banned in many European countries, are the main herbicides used in maize production areas of Southern Xayabury. It is estimated that these pesticides are applied on 86 percent of the maize area in Paklay District and 54 percent in Kenthao District. High quantities of these products (from 3 to 12 liters per hectare for paraquat, 3 kilograms per hectare for atrazine) and water (over 1,000 liters with pump spraying) were recorded [*Programme de Capitalisation en Appui a al Politique de Developpmenet Rurale – Point d'Application du Sud du Sayabury* (PASS)].

[7] PRONAE-PASS, a partnership between NASFRI and CIRAD, promotes direct seeding, mulch-based

Group VI – Annual and perennial cash crops in diverse agro-forestry. Annual and perennial cash crops integrated into diverse agro-forestry systems are applied by some swidden agriculturalist as an alternative to upland rice cultivation. These systems are based on familiar elements of the swidden system, such as small-scale cultivation, intercropping, and NTFP collection. They feature a diverse mix of cash crops in small plot arrangements, including ginger, cassava, pineapple, beans, sesame, pigeon pea, lemongrass, cucumber, vegetables, and domesticated non-timber forest products, together with planted and natural trees. The tree component includes teak, *Broussonetia papyrifera*, different species of fruit trees, and sometimes rubber. In addition, cash cropping is often combined with raising small livestock and fish. These agro-forestry systems are characterized by higher sustainability and lower economic risks as compared to monoculture cash cropping. However, due to lower returns and more complex cultivation and harvesting practices, farmers are only applying the systems if they are provided with initial financial and technical support, often as part of donor-financed projects.[8]

Group VII – Industrial plantations of perennial tree crops. Industrial plantations of rubber and teak—and, to a lesser extent, eaglewood (*Aquilaria*) and eucalyptus—are becoming a common feature of the Northern Uplands. Rubber is the main species among the emerging tree crop plantations with 40,000 hectares currently established and about 120,000 hectares being targeted for planting in Luang Namtha, Bokeo, Oudomxay, Xayabury, Phong Saly, and Vientiane. Farmers often intercrop young rubber trees with upland rice, maize, pineapple, groundnut, and others during the first years after establishment. As rubber trees grow taller and the crown density increases, intercropping stops. An important implication of the rubber plantation development for livelihood security is that a time gap between the end of intercropping and the beginning of rubber tapping (about 5 years) occurs when farmers have difficulty in generating income from the plantation land. About 75 percent of the existing plantations are grown under concession arrangements. Rubber plantations, although only being authorized on bare and fallow land, are increasingly encroaching into existing natural forest areas. Rubber production is also a high-risk venture as compared to other countries because Lao PDR is outside the optimal range of growing rubber conditions (due to longer dry periods, higher elevations, and lower temperatures). An example from China in Box 1 describes a similar cultivation shift from tropical rainforest to industrial plantation—with positive economic results but longer-term negative results to the environment.

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conservation (DMC) agriculture and intercropping as alternatives to monoculture cropping. The approaches show lower yields in the short run but higher labor productivity and better maintenance of soil fertility. The DMC approach is based on 3 principles: (a) no mechanical treatment of soils and no burning for land preparation, (b) crop rotation, and (c) maintenance of permanent soil cover. Crop rotations and use of cover crops also allow for reduced use of herbicides. The new systems are slowly adopted by smallholders and on a small scale due to lack of technological skills, equipment, and credit, and initial high labor inputs (PRONAE: Development and Implementation of DMC Systems in South Asia – Case studies from the Lao National Agro-Ecology Programme.)

[8] For example, Community-based Rural Development Project for Sustainable Food Security in Nga and Xay District, Oudomxay Province (a German Agro-Action Project).

Box 1. Xishuangbanna: From Tropical Rainforest to Industrial Plantations within 3 Decades

Hevea brasiliensis was introduced into Xishuangbanna, southern Yunnan/China in the late 1950s. At that time, Xishuangbanna was characterized by a high coverage of tropical montane and lowland rainforests (approximately 60 percent) and large swidden agriculture areas for production of upland rice (approximately 50,000 hectares annually). In 1976, rubber plantations covered an area of 21,800 hectares and steadily increased to 57,700 hectares in 1982. After the land allocation in 1983/84, where large areas of land (especially swidden areas) had been allocated to villages, farmers started to plant rubber at small scale on their shifting cultivation lands (less than 1,000 meters above sea level), promoted by the state-owned farms, and the total area of rubber increased to 92,500 hectares in 1992. The emerging practice of renting out village lands to outside and local investors, combined with the influx of migrants from other areas, led to a new wave of rubber development.

By 1997, rubber plantations had doubled again to about 180,000 hectares. Rubber also went up the slopes up to 1,200 meters above sea level enabled by the introduction of new varieties that could stand lower winter temperatures. At the same time, natural forest cover decreased to 28 percent. Starting in 1998, as a response to nationwide flood disasters in 1997, the Government of China started massive efforts to restrict deforestation though several programs: the Natural Forest Protection Program, including a logging ban, and the Sloping Land Conversion Program. The latter program stipulated that fallow lands, which had been allocated in 1983/84 as shifting cultivation lands, needed to be re-classified as forest land if they have a tree cover of over 30 percent with trees greater than 8 centimeters diameter at breast height. The Government also stopped all public investment into rubber plantations. Still, the curbing effect on rubber development was short-lived. As prices for rubber increased, rubber plantations increased to 216,000 hectares in 2003 and an estimated 420,000 hectares in 2007 (Guo Huijin 1993; Zhu Hua 2008).

The impact on rainforest cover and plot size has been tremendous: tropical lowland rainforests have been reduced and fragmented from 2,306 patches with average size of 90.6 hectares in 1976 to 3,668 patches with average size of 18.9 hectares in 2003. In the same period, rubber plantations increased from 1,100 patches with average size of 19.9 hectares to 4,592 patches with average size of 47.1 hectares (Zhu Hua 2008).

A case study by Liu Wenjun (2005) in Menglun Township, Xishuangbanna, showed that the rubber plantations have expanded from 12 to 40 percent of total land area within 15 years. This expansion has generally occurred at the expense of forests and swidden agriculture, which decreased from 48 to 30 percent and 13 to 0.7 percent, respectively. The majority of rubber expansion was in the lowland areas where suitable microclimates and proximity to roads favored the development of rubber industry. Economically, all the villages showed an increased standard of living, the total net income of the township increased from 4 million to 44 million Chinese Yuan over the same period, most notably in the lowland villages. However, the increasing population and improved living standards may continue to place pressure on the environment and increase demand for limited resources, in particular forests.

In conclusion, Xishuangbanna is a model where shifting cultivation has been almost completely replaced by other forms of land use, most notably rubber plantations. This development, induced but not pushed by policies, was mainly due to market demands and private sector investment. The positive effects on living standards of the local population however come at high environmental costs. Long-term impacts also include negative effects on climate (Yoshino 1986), on carbon sequestration (Xiuping Zou and others 2005), and probably on the tourism industry. The heavy use of pesticides, fungicides, and insecticides in rubber plantations is also of serious concern.

Group VIII – Intensified production of large livestock. Animal husbandry has always been an important element of the rural Lao household economy. Livestock provides draught power for cropping and transport (cattle and buffalo), protein in household diets (pigs and poultry), and organic manure to maintain fertility of paddy and other cropping areas (large ruminants). Livestock (large animals) represent a

financial asset to households and is used in socio-cultural events and village ceremonies as sacrifice. Livestock is an easily liquidated asset, able to be sold in all seasons, in any condition, and at any stage of maturity. In remote areas with limited access, cattle and buffalo can be walked to distant markets. The new trend observable across the Northern Uplands is the intensified production of large livestock, especially cattle (with new breeds such as Chinese Yellow); goats (mainly Katjang, common in Southeast Asia); and water buffalo. The trend is characterized by uncontrolled forest grazing, foraging with limited supervision, deliberate and repeated use of fire in forest areas to induce growth of fresh grasses, and poor and insufficient pasture/fodder management. About 87 percent of rural households in the Northern Uplands engage in large livestock production, of which about 38 percent sell livestock.

C. Geographical Clusters of Production Systems

The traditional and emerging production systems appear in four broad geographical clusters of subregions across the Northern Uplands:

- **Western part** includes Bokeo, Luang Namtha, Oudomxay, southernmost Phong Saly (Meung Khua District), and northernmost Xayabury Provinces,
- **Northern part** includes Phong Saly Province (excluding Meung Khua District).
- **Eastern part** includes Luang Prabang (except for small parts along Mekong and lower Nam Ou rivers), Xieng Khouang, and Houa Phan Provinces.
- **Central part** includes the Mekong and lower Nam Ou corridor in Luang Prabang Province and the northern part of Vientiane Province (Vang Vieng and Kasi Districts).

These clusters are associated with similar agro-ecological conditions and elevation, similar farmer responses to market incentives, and outcomes of priority implementation of certain upland policies. Figure 1 shows images of the traditional and emerging agricultural systems.

The **western part** features basin and valley areas for paddy rice cultivation and larger areas of comparably lower elevations (300-800 meters above sea level) with favorable conditions for planting rubber and teak. In general, the stabilization of swidden agriculture is much advanced and no longer perceived as a policy implementation issue by the Provincial Agriculture and Forestry Offices (PAFOs) and District Agriculture and Forestry Offices (DAFOs) in these provinces. In addition, the transition to alternative livelihood systems has progressed. A higher forest cover has been retained during the transition as compared to other subregions due to the availability of fertile basin areas for agriculture. Exceptions are found in the new maize districts of Meung Beng and Meung Houn in Oudomxay, and the rubber boom areas near Meung Sinh and Luang Namtha town of Luang Namtha Province. Agricultural systems are characterized by the pre-eminence of ‘stabilized’ fixed rotational cropping of upland rice and cash crops and industrial tree plantations. Diverse agro-forestry systems are practiced at small-scale in Oudomxay and Southern Phong Saly (Meung Khua) in areas where marketing options for specific crops and non-timber forest products exist because of good road and river transport infrastructure and proximity to cross-border markets.

Table 1. Typology of Traditional and Emerging Agriculture Production Systems

<table>
<tr><th colspan="4">Characteristics</th><th>Location</th></tr>
<tr><td colspan="5">Group I. Swidden agriculture</td></tr>
<tr><td colspan="4">Mostly in young/medium age secondary forests with medium to long fallow periods. Mainly upland rice but with many other crops (tubers, beans, fruits) as diverse land use system. NTFPs important in times of rice shortage. No pesticide / herbicide use. Final vegetation cover usually natural forest vegetation, which quickly regenerates during fallow periods in absence of large livestock numbers. Long fallows ensure maintenance of soil fertility; stable yields. Fallow improvements not common.</td><td rowspan="4">In remote locations, away from main roads and rivers</td></tr>
<tr><td>Initial vegetation cover</td><td>Resource user</td><td>Final vegetation</td><td>Fallow length</td></tr>
<tr><td>Young secondary forest common</td><td>Indigenous communities</td><td>Natural forest</td><td>5-8 years (medium)</td></tr>
<tr><td>Mature secondary forest less common</td><td>Indigenous communities</td><td>Natural forest</td><td>> 8 years (medium to long)</td></tr>
<tr><td>Mature secondary forest rare</td><td>Indigenous users</td><td>Agro-forest</td><td>None</td></tr>
<tr><td colspan="5">Group II. Paddy-rice cultivation</td></tr>
<tr><td colspan="4">Rain-fed wet season rice; and gravity-based irrigation during the dry seasons; traditional rice varieties, minimal use of chemical fertilizer and pesticides; low levels of mechanization.</td><td>Small areas in Houa Phan</td></tr>
<tr><td colspan="5">Group III. Fixed Rotational Cropping</td></tr>
<tr><td colspan="4">Stabilized form of swidden agriculture; 3-4 plot system; often only on lower /middle slopes. Upland rice but with cash crops on small scale. Nearly complete elimination of fallow periods; declining yields, beginning market opportunities; negative impacts on soil fertility and soil erosion; increasing weeding requirements requiring the use of pesticides for weeding.</td><td>Throughout Northern Uplands along roads and rivers</td></tr>
<tr><td colspan="5">Group IV. Modernized rice-based farming</td></tr>
<tr><td colspan="4">Evolving from traditional systems (Group II); mechanized plowing, high yield varieties, mineral fertilizer, pesticides, supplemental irrigation; dry-season rice replaced by cash crops.</td><td>Vientiane</td></tr>
<tr><td colspan="5">Group V. Annual cash crops in monocultures</td></tr>
<tr><td colspan="4">Large-scale monocultures replacing upland rice; beginning encroachment into young regenerating/natural forest; primarily maize, Job's tears, sugarcane; to a lesser extent rice bean, black cowpea, peanuts, sesame, cassava; use of hybrid varieties for maize, fertilizer and pesticides, burning of residues for land preparation, cultivation on steep slopes, sometimes with tractors; often inappropriate application of new technologies; soil degradation and nutrient loss, decreasing yields; possible improvement through direct seeding, mulch-based conservation and intercropping but currently on very small pilot scale.</td><td>Maize: Meung Kham, Beng,
Meung Houn, Nalae, Southern Xayabury,
Job's tears: Luang Prabang
Sugarcane: Phong Saly</td></tr>
<tr><td colspan="5">Group VI. Annual/ per- ennial cash crops in agro- forestry systems</td></tr>
<tr><td colspan="4">Mix of cash crops on small plot arrangements with distinct tree component; practiced as alternative to upland rice but based on familiar elements of swidden system (small-scale, intercropping, and NTFP collection); high sustainability and low economic risks; more complex cultivation and harvesting practices; farmers require significant support financially and technically.</td><td>Around Oudomxay provincial capital; Southern Phong Saly</td></tr>
<tr><td colspan="5">Group VII. Industrial plantations of perennial crops</td></tr>
<tr><td colspan="4">Small to large plantations of rubber, teak, eaglewood, tea and Eucalyptus, often in concession arrangements; rubber plantations replace existing natural forest, encroachment into forest areas; limited intercropping initially possible; uncertain how farmers bridge period before rubber tapping begins..</td><td>Vientiane, Luang Prabang, Bokeo, Southern Xayabury, Oudomxay</td></tr>
<tr><td colspan="5">Group VIII. Intensified production of large livestock</td></tr>
<tr><td colspan="4">Production of cattle and goats (new elements in the Northern Uplands) and buffalo with mainly traditional practices: free forest grazing, foraging with limited supervision, deliberate use of fire in forest areas to induce growth of fresh grasses, and poor pasture/fodder management.</td><td>Xieng Khouang, Luang Prabang, Houa Phan
Provinces</td></tr>
</table>

Figure 1. Images of Traditional and Emerging Agriculture Production Systems

Traditional swidden system

Traditional rain-fed paddy rice

Fixed "stabilized" rotational agriculture

Annual monoculture rice cropping

Rubber plantation development

Intensified livestock production

The **northern part** is distinct due to high elevations of 800-1,400 meters above sea level, virtual absence of lowland areas for rice paddies, and unfavorable conditions for planting rubber and teak, except in small basin areas of Buon Tai and Buon Neua. It is characterized by poor infrastructure; as a consequence, market dynamics emerge only in the more accessible areas. Swidden agriculture as well as opium cultivation are still perceived as problematic issues by local authorities and are focus of current policy implementation efforts. To date, only 50 percent of the province's villages have gone through the Land and Forest Allocation Program. Out-migration trends combined with restrictions on land access on previous upland fallows and restrictions in land use are presently leading to larger-scale natural regeneration of fallow lands and young secondary forests.[9] The dominant agricultural production systems are traditional swidden agriculture and, more recently, stabilized fixed rotational cropping in areas of LFAP implementation.

The **eastern part** is characterized by plateau areas with elevations of over 1,000 meters above sea level and also by limestone mountain areas and broader river valley bottoms. Stabilization of shifting cultivation is still perceived as an issue and focus of policy implementation. As a coping strategy to land use restrictions, livestock production is a new element in its intensified form. Fire is often used to promote growth of forage in previously forested areas. The landscape has been dramatically transformed by fire dynamics, and overgrazing has led to the near complete removal of natural shrub and forest vegetation. Rubber and teak plantations are absent. Maize monocultures dominate in Meung Kham District and areas close to the Vietnamese border.

A small **central part** is located along main rivers in tourist centers where off-farm income plays an important role. Here, teak plantations are common.

[9] Interview with PAFO & Vice-Governor of Phong Saly.

III. UPLAND AND AGRICULTURE POLICY

The Government's vision for the Lao rural sector is to reduce the disparities between rural and urban areas by enhancing transport and communications networks and by improving the living conditions of the rural population in remote areas. A specific element in this strategy is the geographical targeting and the prioritization of 47 "very poor" districts across the country, of which 32 are located in the Northern Uplands, mostly remote upland districts with poor infrastructure which are eligible for special poverty reduction programs. This approach of geographical targeting clearly reflects the Government's recognition of the need to increase poverty reduction efforts in remote upland areas and to reduce inequalities between different ethnic groups in Lao PDR.[10] The vision for the agriculture sector, primarily directed at the lowlands of Lao PDR, is to transform agriculture into a thriving sector based on innovative technologies and practices in high value-added production and processing, catering to domestic and international markets. The Government has moved forward on upland poverty and agriculture policy with its National Socioeconomic Development Plan and Elaborated Plan and other programs and interventions.

A. National Socioeconomic Development Plan 2006-2010 and Elaborated Plan

The Sixth National Socio-Economic Development Plan (NSDEP) 2006-2010 includes aspects of upland area as well as agriculture, forestry, and fisheries development.[11] Aiming to achieve the NSDEP-set goals and targets, an Elaborated Plan, consisting of 11 national programs and 111 focus projects, details some of the NSDEP policy directions. This plan was compiled by Government to implement the resolution of the 8th Party Congress of March 2006.

The NSDEP and the Elaborated Plan make multiple references to upland development, agriculture development, as well as rural poverty reduction and include a mix of partly duplicating and sometimes overlapping output targets, policy statements, and specific sector interventions and activity proposals. Three elements however, emerge as the main cornerstone of the Government's upland development approach which envisages a far-reaching transformation of agriculture and rural resource use and management:

- Land and Forest Allocation Program
- Stabilization of Shifting Cultivation Policy
- Village Cluster (*Koum Baan*) Development

These programs and policies re-enforce each other and are implemented at the grassroots level. The outcomes of the implementation of these programs and polices are discussed in Chapter V.

Land and Forest Allocation Program. Initiated in 1993, the Land and Forest Allocation Program was an exercise in rural land zoning.[12] Implementation of the LFAP has been largely completed in the Northern Uplands, except for Phong Saly

[10] The Priority District Approach is reviewed in detail in the Poverty and Social Impact Analysis (World Bank, forthcoming).
[11] Committee for Planning and Investment, NSEDP (2006-2010), Vientiane, October 2006.
[12] Initiated under MAF Instruction No. 822/AF, *Land-Forest Allocation for Management and Use*.

where the program has covered only about half of all rural villages. The major LFAP objectives are to promote sustainable management and use of natural resources, prompt reduction and gradual elimination of shifting cultivation, and encourage commercial agriculture production.[13] The LFAP involves a village-level planning exercise that includes forest and agricultural land use zoning; land suitability assessments; demarcation of village boundaries; formulation of management regulations and hand-over of management responsibilities to villages; and plot measurement and allocation of permanently used land plots (e.g., paddy fields, gardens, orchards, plantations, and residential areas) with temporary land use rights to individuals, villages, and commercial organizations.[14]

Stabilization of Shifting Cultivation Policy. The elimination or stabilization of shifting (swidden) cultivation by 2010 is among the many targets of the NSEDP with the purpose of transforming subsistence farming into sedentary market-oriented commercial agriculture and improving food security in rural areas. The policy—originally aimed at halting pioneering shifting cultivation in natural forest areas but soon rendered into a complete ban of shifting cultivation with a strong bias against the cultivation of upland rice—has actually led to increased vulnerabilities and rice shortages in a number of upland areas. Nevertheless, the Government is committed to halt all forms of shifting cultivation by 2010 or earlier.

Village Cluster (Koum Baan) Development. The Village Cluster Development represents the Government's policy and approach of making development services available to scattered and remote upland communities that would otherwise not be reached with the limited resources at hand. Its long-term development objective is to improve the provision of public services, including education, health, electricity, market access roads, and communications. Most emerging village cluster areas are located along rural roads and highways, and many have been provided with improved health and educational facilities. In addition, the Village Cluster Development is also seen as a new way of further decentralizing administrative support from the district level to the grassroots level. The Village Cluster Development has emerged from the previous Focal Site Development. In recent years, the relocation of upland communities closer to road infrastructure and other public services has been closely associated with the objectives of the Land and Forest Allocation Program and the Stabilization of Shifting Cultivation Policy. Within the Village Cluster Development, the allocation of land continues to be a contentious issue, especially as most of fertile arable land suited for paddy rice production has for many generations already been occupied, predominantly by ethnic lowland Lao. Resettled households have often not had access to agriculture land or paddy areas that are suited for lowland rice production. This has resulted in increasing rice shortages. As a result, communities are often temporarily returning to old swidden areas and resorting to upland rice cultivation.

Two other policy objectives are relevant to upland agriculture development.

Industrial tree crop plantations. A number of focus projects promote industrial tree crops, particularly the establishment of rubber plantations, which is often undertaken with support from private firms from Lao and neighboring countries, usually through

[13] Lao Swedish Forestry Program, 2004. Participatory Land Use Planning and Land Allocation. National Agriculture and Forestry Research Institute (NAFRI). Vientiane.

[14] The monitoring and evaluation stage of the LFAP process has not been implemented. To date there has been no systematic assessment of the outcomes and impacts of the LFAP.

contract farming arrangements. Each northern province and some districts have set area targets for rubber and other plantation trees. In some provinces, land concessions have been granted for establishment of rubber and other plantations.

Forest management and timber industry development. Government stresses the importance of the country's forests for rural development and has developed a comprehensive forestry strategy. Specific policy objectives advocate for the maintenance of the natural forest cover for rural livelihoods, assurance of adequate water supply, and mitigation of natural disasters. The objectives also include to ensure a sustainable stream of diverse forest products for domestic processing, consumption, and exports; and to preserve forestry biodiversity. This would be met through identifying and delineating the national forests estate along production, protection, and conservation forests; completing of mandatory forest inventories and management plans prior to the authorization of harvesting operations in production forests; closing forest areas for commercial use until approved management plans are in place; devolving management responsibilities to communities; and strengthening transparency in timber sales procedures and promoting value-added domestic processing of timber.

The elements of the upland policy framework as included in the NSDEP and Elaborated Plan are summarized in the Box 2.

B. Agriculture and Forestry Sector Strategy – 4 Goals and 13 Measures

The Ministry of Agriculture and Forestry has formulated 4 Goals and 13 Measures to execute the resolution of the 8th Party Congress and achieve NSEDP targets under its responsibility. The goals and measures represent agriculture and forestry sector strategy and incorporate most above-mentioned policies, programs, and projects.

The 4 Goals are:

Goal 1, Food production/security. This goal's targets include achieving an agricultural sector growth of 3.4 percent annually; per capita annual food production of 400-500 kilograms (corresponding to 3.3 million tons of paddy rice); increased food supply in the 47 poorest districts to the national average of 350 kilograms per person per annum; and increased production of meat, eggs, fish, and fresh milk by 5 percent annually, corresponding to an average consumption demand of 40-50 kilogram per capita per year.

Goal 2, Commodity production. This goal seeks to achieve a steady supply of raw materials and agriculture and forestry products going to the domestic processing industry and to increase the export share of agriculture and forestry products to 30 percent of total exports (approximately US$1 billion) by 2010.

Goal 3, Stabilization of shifting cultivation. This goal seeks to achieve the elimination of upland shifting cultivation practices as specified under the NSDEP and Elaborated Plan. It is seen as the main strategy of poverty reduction in the 47 poorest districts, as well as important for improved environmental protection.

Goal 4, Sustainable forest management. This goal's target includes increasing forest cover from the 41.5 percent to 53 percent of the total land area (or from 9 million hectares to 12 million hectares) by 2010. Plantations of rubber, eucalyptus, teak, and other tree crops will contribute to this goal as part of the MAF reforestation program.

Box 2. Policies, Programs, and Interventions of NSDEP and Elaborated Plan for Agriculture and Upland Development

Elaborated Plan - Program 2
• Land allocation and land development for agriculture • Rice production to ensure food security by promoting intensive cultivation in 7 large flat land areas and 14 small flat land areas • Development and management of water and water resources • Expansion and improvement of irrigation systems to ensure their sustainability • Plantation of industrial and commercial crops, such as rice CR 2003, organic coffee, corn, sugar cane, beans, tobaccos, vegetables and fruits, cotton, etc. • Organic agriculture (clear and organic agriculture, pollutant and pesticide free agriculture); good practice; and integrated agriculture • Livestock and poultry for domestic consumption and export • Cattle and goats production for poverty reduction for poor families in uplands • Aquaculture and fish raising • Establishment of centers for livestock breeding, animal food production and fish hatchery • Control of insects and animal decease • Promotion family business and establishment of cooperatives and production groups • Skill development for farmers • Promotion of marketing of agriculture production
Elaborated Plan - Program 3
• Improvement of wood processing factories with promotion to produce finished products for exports • Rehabilitation and development of forest resources for the economic purpose and environmental protection • Promotion of commercial tree plantation, such as teak, agars wood, rubber, eucalyptus, etc. • Harvesting and processing of NTFPs in conjunction with plantation and rehabilitation of such resources • Conservation of forests and biodiversity, such as protected areas and endangered species • Plantation of medicinal trees and plants • Land survey and land allocation
Elaborated Plan - Program 6
• Alternative employment to replace shifting cultivation • Resettlement and allocation of permanent production land to resolve shifting migration of ethnic communities • Improvement of management and use of poverty reduction funds to eradicate poverty in communities (loan by World Bank) • Support government funds for village development and provision of credit for production and service to generate income and to alleviate poverty • Development of the old revolutionary-army base • Promotion and mobilization of all economic sectors and social strata to participate in poverty eradication • Survey and data collection on poverty and to set standard

The 13 Measures are:

Measure 1, Agriculture and forestry sector perspective. This measure includes executing the Resolution of the 8th Party Congress on the Agriculture and Forest Sector and enhancing cooperation to support and understand responsibilities, ownership, and ways of implementing the agriculture sector's development priorities from now to 2010, particularly focusing on the process of establishing village and development groups.

Measure 2, Survey and allocation of agriculture and forestry production zones. This measure includes zoning for rice production and increasing productivity in irrigated

and non-irrigated areas; zoning for intensive agricultural production and development of a new cooperative system; reviewing of land/property lease policy; completing forest land allocation; and formulating detailed policy and measurements to strictly enforce and manage protected areas, watersheds/upstream/water sources and other areas.

Measure 3, Seed and breed availability. This measure includes improving seed varieties, with emphasis on rice and coffee varieties; improving animal breeding through hybrid breeding; improving grass seed for forage; and enhancing investment, training, and marketing.

Measure 4, Extension and technical services, and human resources development. This measure includes promoting high productivity and low-cost investment production techniques and technologies; DAFO capacity building and development of technical staff and establishment of technical and information service centers for village development groups.

Measure 5, Establishment of village development groups linked to sector development. This measure includes implementing the Politburo Order on the establishment of village cluster development groups (*koum ban patthana*) with the objective of moving development toward the grassroots level.

Measure 6, Organizing production and establishing economic structures from local/ grassroots levels. The measure includes strengthening production groups in pilot areas to enable formation of production cooperatives; developing cooperative services, marketing systems, processing services, communications, and savings and credit opportunities; and formulating relevant procedures.

Measure 7, Irrigation and prevention of droughts and floods. This measure includes allocating irrigated areas for integrated agricultural development zones; implementing integrated agriculture properly; improving and expanding reservoir systems to mitigate droughts and floods; maintaining irrigation pumps; and promoting use of energy efficient pumps.

Measure 8, Increase productivity. This measure includes supporting more intensive use of agricultural techniques to increase agricultural and forestry productivity through application of fertilizer, compost, improved seeds, and advanced technology.

Measure 9, Quality control and disease prevention. This measure aims to improve bio-safety of food for consumption and ensure compliance with the Association of Southeast Asian Nations (ASEAN) and World Trade Organization (WTO) procedures and principles.

Measure 10, Financial mechanisms. This measure includes improving the use of assistance provided by development partners and internal and external public and private investment.

Measure 11, Achieving economies of scale in production (lowering production costs). This measure includes doubling productivity by expanding the production of goods with a comparative advantage; applying modern technology; using energy more efficiently; and developing policies and quality control measures to support

production.

Measure 12, Implementation of monitoring and evaluation.

Measure 13, Decentralization. This measure includes instituting a management hierarchy that supports collaboration among the Government, people, and economic sectors.

C. General Policy Implementation Issues

Under the framework of the 4 Goals and 13 Measures, the Government is pursuing the rationalization of agricultural production patterns in upland areas. At the same time, poverty reduction, while being an important national goal, is regularly construed in the Government's policy documents as an outcome of the primary national goals of economic growth and transformation, and it is not the only goal of agricultural development. While the primary objective of the agriculture sector includes increased food production (including promotion of national rice self-sufficiency) as well as increased availability of agricultural raw materials for processing and export, it is likely that there are trade-offs with poverty reduction goals.

Findings also suggest that equity considerations have not been the primary consideration in policy implementation. While agriculture (upland agriculture in particular) has been the main driver in rural poverty reduction over the past 10 years, official data demonstrate a continuous decline in public expenditure in agriculture, whether measured as a percentage of national or agricultural GDP, or in absolute amounts.[15] In 2000/01 and 2004/05, public expenditure on agriculture averaged almost 4.5 percent of agricultural GDP. However, the figure showed a near-consistent downward trend over the five years, from over 8 percent at the start of the period, to one-third of this figure (2.6 percent) by the end of the analysis period. As a proportion of total national GDP, agricultural expenditure fell from 4.3 percent to 1.2 percent, which portrays a worrying decline in the amount of public resources being spent on agriculture relative to its value added.

In addition, from an equity perspective, the Government's growth-oriented agriculture investment policy directs the bulk of all public expenditure to the productive lowlands, which are seen as the vectors of the country's economic development. This creates significant disparities between lowlands and uplands. In general the better off provinces with lower poverty headcounts and a higher Human Development Index (HDI) appear among top recipients of agriculture public spending, with only few upland provinces with low HDI rankings and high poverty headcount (e.g., Luang Namtha and Bokeo) receiving some high per capita recurrent agricultural spending. More equitable agricultural public expenditure could be expected to have a positive impact on poverty reduction in those provinces where poverty levels remain the highest.

While the 4 Goals and 13 Measures provide a general guidance to the PAFO and DAFO and other MAF personnel responsible for implementing agriculture development interventions, the provincial implementation progress and performance varies, indicating that central-level control in policy implementation is weak. At the provincial level, in spite of a strongly asserted commitment to the national agenda and

[15] Government of the Lao PDR, Various years, Official Gazette. Special issues I and II.

national agricultural policy, implementation is often compromised for logistical and budgetary reasons.

Provinces and districts generally affirm that they are working within the framework of the 6th NSEDP and the 4 Goals and 13 Measures. However, provincial autonomy enables provinces and districts to put forward their own interventions based upon local perceived needs, but the final configuration is often determined by the availability of donor funding and private commercial investments. In fact, provinces often adopt an opportunistic approach to agriculture development that seeks to take advantage primarily of private sector investments into the Northern Uplands; priorities are adjusted according to investor choices. In addition, regardless of policy intent, actual policy implementation performance is often determined by the availability of adequate numbers of staff.

The policy of creating sedentary livelihoods for ethnic groups, who have only ever practiced shifting cultivation, has been shown to have serious impact on food security. Although the LFAP has attempted to introduce more secure land tenure for upland communities, the program has resulted in food insecurity for many. The LFAP was implemented too rapidly in many areas. As a result of being target-driven, policy implementation has led to complications for villagers in the form of inexperience with traditional shifting cultivators in paddy production, insufficient consideration of soil and land capability as well as limited availability of paddy land, and social tensions resulting from relocation of upland communities into lowland areas.

There are also widespread technical misunderstandings and issues in selecting adequate means for achieving set objectives. Senior administrators in Houa Phan Province saw cattle and buffalo grazing in rehabilitating forests as a legitimate method of accelerating reforestation. Table 2 summarizes how different provinces have implemented national policy goals.

Table 2. National Policy Implementation at the Provincial Level

Province Northwest	*Food production*	*Commodity production*	*Stop slash & burn*	*Sustainable forestry*
Bokeo	• Expansion of irrigation	• Expansion of irrigation	• Not perceived as critical issue	• In compliance with policy but using industrial trees to reforest
Luang Namtha	• Focus on rice production • Livestock raising not a priority as it conflicts with tree plantations	• Highest priority • Contract farming as tool to promote cash crops	• LFAP completed but not respected in all areas • LFAP now lowest priority	• Natural forests being converted to industrial trees • Threat of rubber invading National Biodiveristy Conservation Areas
Xayabury	• Expansion of irrigation	• Focus on maize mono-cropping • Some districts aim to replace maize in light of soil degradation and low productivity	• Shifting cultivation dominated by maize production • Maize moving into forest areas • LFA complete, not respected	• In compliance with policy but using industrial trees to reforest • Maize moving into forest areas • Extensive logging • 42% forest cover
Oudomxay	• Expansion of irrigation but targets have not been achieved due to lack of resources • Weak commitment • Food security an issue in some districts • Push-pull leading to livestock	• Maize becoming a monocrop • Push: rubber dominates • Lack resources • Market problems in some districts	• In compliance with policy, • Highest priority, regulation enforced, but 20% no LFAP; PAFO unsure about alternatives; opium continues; and livestock, rubber only alternatives	• Some logging • Using industrial trees to reforest
Luang Prabang	• Expansion of irrigation • Livestock promoted only where grazing land is available	• In compliance with policy • Teak is cash crop • Rubber tree concessions, using fiscal policy to control	• Significant deforestation in northern area of province • Main agricultural problem in the province • 9 options to solve • Target too high	• Soils not suitable for forest trees in northern area of province • Possible only if slash & burn stops • Using industrial trees to reforest
Phong Saly	• Limited land available for food production • May be one cause of out-migration • Rural households buying food • Livestock lack breeding stock • Livestock less important than rubber in some districts	• In compliance with policy • Rubber, cane, tea • Supporting food security • Links to market yield survival • Contract farming issues, re-negotiate agreements • Improved roads yield agricultural development	• In compliance with policy, but not possible to end by 2010 • 85% success • No land available for LFAP, 47% complete • May be one cause of out-migration	• Population expansion & demand for land for commercial crops yield forest encroachment • Forest cover equaled 23.55% (2002); 50% by 2010
Vientiane	• In compliance with policy • Irrigation	• In compliance with policy • Vientiane market dominates	• In compliance with policy	• Using industrial trees to reforest
Houa Phanh	• In compliance with policy	• In compliance with policy	• In compliance with policy	• In compliance with policy

Table 2. National Policy Implementation at the Provincial Level

Province Northwest	*Food production*	*Commodity production*	*Stop slash & burn*	*Sustainable forestry*
	• Irrigation • Strong focus on livestock • Change emphasis from rice to cash crops	• NTFPs, maize, tea, beans, fruit but only small volume possible without irrigation • Strong market pull from China, Vietnam • Good contract farming models	• Village cluster • LFAP implemented only when project funds are available • Several pilot projects led by governor • Focus on cash crops	• Relocating villages from watersheds
Xieng Khouang	• PAFO operations conform to provincial development strategy: livestock is high priority • Pasture development first • New cattle breeds from Vietnam	• Improved pasture yields reduced poverty through livestock • Limited support & recognition of maize revolution	• LFAP not implemented; only 96 out of 400 villages complete • No rules, no enforcement, no budget • First priority of provincial governor	• First priority of provincial governor is to protect economically valuable trees

IV. EMERGING MARKET DYNAMICS AND IMPACTS

Regional market dynamics reinforced by traditional cross-border trade linkages and geographic determinants of comparative advantage are the principal drivers in the transition toward market-oriented agriculture in the Northern Uplands. The penetration of the market pull into the Northern Uplands is closely associated with the increasing availability of road infrastructure and market proximity while a broader enabling framework for expanded investment and trade in agriculture has yet to evolve from its current rudimentary base. The LECS survey data of 2002/3 indicate that market development is nascent—25 percent of all transactions is taking place through barter; nearly 60 percent of household consumption is self-produced; only 12 percent of the main staple (glutinous rice) is traded compared with 60 percent of rice traded in Vietnam a decade ago; and the majority of crop-producing or livestock-rearing households do not sell crops or livestock. However, although not reflected in the latest available survey data but supported by information from provincial authorities and field observations, market development and commercialization have considerably accelerated during the last five years and are expanding into upland areas.

A. Regional Trade Agreements and Strategies

Besides the progress made in recent years in improving transport and communication infrastructure, free trade agreements among Greater Mekong Subregion (GMS) member countries and bilateral and multilateral trade and investment initiatives launched by Thailand, Vietnam, and China are beginning to shape the environment for private sector commercial activities in the Northern Uplands.

Ayerwaddi-Chao Phraya-Mekong Economic Cooperation Strategy (ACMECS). The 2003 plan of action promotes bilateral trade and investment between Thailand and Cambodia, Lao PDR, Myanmar, and Vietnam. Investments in the form of contract farming have been the major vehicle for producing agricultural products. As part of the strategy, several border areas in Cambodia, Myanmar, and Lao PDR, including Bokeo and Xayabury in the Northern Uplands, have been designated or are being discussed for the promotion of contract farming for Thai companies for a variety of agricultural crops and livestock. Thailand has also eliminated import tariffs for many agricultural crops.

China-ASEAN Trade in Goods (TIG) Agreement. Signed in 2005, the TIG Agreement marks an important step toward forming a China-ASEAN Free Trade Agreement (CAFTA) by 2010, and with a combined population of 1.8 billion will form the world's third largest free trade area after the European Union and the North America Free Trade Agreement (NAFTA). Under the TIG Agreement, China eliminated tariffs for approximately 600 agricultural raw material imports from Lao as of January 1, 2006. China continues to impose a 20 percent tariff on rubber imported from Lao PDR to protect its domestic rubber production. While the TIG Agreement and the zero tariff policy for Lao products are not specifically aimed at promoting contract farming, they serve as important incentives for Chinese traders, investors, and agro-processors to source agriculture products and raw materials from the Northern Uplands for export.

In addition, ongoing customs reforms and harmonization of trade regulations within

the GMS are facilitating the expansion of cross-border trade and investment. The GMS Business Forum has prepared a Customs Code Comparison that summarizes regulations and procedures for the imports and exports of each GMS country. The GMS member countries have adopted the Harmonized Commodity Description and Customs Coding System that serves as a classifying procedure for goods entering through Customs as imports and leaving as exports, covering all commodities that are traded among GMS member countries.

B. Contract Farming Arrangements and Land Concessions

The emergence of contract farming arrangements and land concessions are the recent most notable features of the commercialization of upland agriculture in the Northern Uplands. Contract farming arrangements and land concessions can be distinguished along the following definitions:

- ***Contract farming*** refers to agreements between farmers and processing and/or marketing firms for the production and supply of agricultural products under forward agreements, frequently at predetermined prices. The arrangement also invariably involves the purchaser in providing a degree of production support and technical advice. The basis of such arrangements is the commitment on the part of the farmer to provide a specific commodity in quantities and at quality standards determined by the purchaser and a commitment on the part of the company to support the farmer's production and to purchase the commodity (Eaton and Shepherd 2001).
- ***Land concession*** is used in different and sometimes inconsistent ways but generally refers to arrangements when foreign or domestic enterprises are granted leases of large areas of land for commercial production of cash crops or plantation forestry.

Annex C provides a list of contract farming arrangements in the Northern Uplands. Government policy, as stated in the NSDEP, encourages private initiatives, including those by foreign investors and traders from neighboring countries to promote contract farming, especially in horticulture and tree crops. In the absence of clear guidelines from the Central Government, namely the Ministry of Agriculture and Forestry and the Ministry of Planning and Investment, during the early stages of contract farming development in the Northern Uplands (beginning in 2003 and on a larger scale in 2004), provinces and districts were required to be innovative in their dealings with domestic and foreign investors interested in contractual arrangements. A number of models have been tested with a mixture of results. Only a few models have emerged that merit further consideration as standards that may meet the needs of local farmers and provincial and central authorities controlling business and commerce under their jurisdictions.

2-plus-3 Model. The most common approach used is the '2-plus-3 model' wherein farmers provide the land and labor to cultivate the crop and the commercial enterprise supplies capital investment (planting material and fertilizer), technology transfer to farmers and technicians (training), and access to the market. The '2-plus-3' model has become a model strongly promoted by MAF policy and gained even more attention after May 2007 when the Prime Minister announced a moratorium on land concessions.

The principal modalities of the '2-plus-3' arrangements are something in between contract farming arrangements and land concessions, not fitting one or the other definition. The contractual arrangements are usually made between provincial or district authorities and private firms entailing the production of a certain commodity on a certain number of hectares in a certain area (e.g., district).[16] Local authorities facilitate the participation of smallholder producers in the schemes in different ways that range from incentives to compulsory participation by setting production targets. Arrangements between Chinese companies and local government in Luang Namtha and Oudomxay include negotiated benefit sharing on plantations, with collected rubber being split between enterprise and smallholder by 50:50, 60:40, or 70:30, etc. depending on the arrangement; an example of such an arrangement is discussed in Box 3.

Throughout literature, the '2-plus-3' formula is generally assessed as a valuable alternative to land concessions and as a model that ensures benefits are divided between smallholders and investors in a reasonable way. Smallholders should benefit under these arrangements through access to credit, markets, and technical assistance made available through a company. Village-level management is left in the hands of local marketing group leaders, usually lead farmers who are known and respected by the community. The enterprise partner benefits from this arrangement by not having to deal directly with individual farmers and having harvesting and transport organized by local farmers representatives.

More recently, the model has been criticized for farmers' lack of participation and their dissatisfaction with the arrangements (Vongkhamor and others 2007), particularly in the case of rubber planting as farmers in remote areas with limited alternative income sources cannot afford the prolonged uncompensated labor input during the pre-tapping stage of 7 to 8 years (Weiyi Shi 2008). In addition, field observations indicate that the '2-plus-3' arrangements—free land, cheap labor, and the shared risk of economic failure—can provide huge subsidies to commercial investors at the expense of the smallholder. In this way several shortcomings in the Lao business environment, especially the lack of long-term land tenure security, which would be the main limiting factor for private investments, are conveniently overcome. Furthermore, private investors from neighboring countries receive even more policy incentives and generous subsidies from their own governments. The Chinese government, for example, owing to scarcity of suitable land, encourages rubber planting in the Northern Uplands through the Opium Replacement Special Fund.

[16] Because of the need to raise inputs locally, contract farming arrangements for rubber in Luang Namtha sometimes involves small land concessions on the order of tens of hectares (Vongkhamor and others 2007).

Box 3. Contract Farming for Rubber in Namo District, Oudomxay Province

The contract for rubber farming, signed in March 2006 between the Head of Namo District and the director of Ying Jiu Pa Company, is a typical arrangement under the '2-plus-3 scheme'. Copies of the contract were distributed among different provincial and district offices as part of the committee that approved the investment plan. The contract stipulates that the company provides seedlings and technical support and purchases the latex when tapping begins. Farmers are obliged to provide land and labor. The 60:40 profit-sharing arrangement is 60 percent for farmers and 40 percent for the company for the rubber as well as the timber once the trees stop producing sufficient latex (usually around 30 years of age). The price for rubber is set at the actual market price, but a floor price of US$750 per ton is guaranteed in the contract. The contract is valid for 30 years with an option for extension of an unspecified length of time.

The majority of farmers interviewed in Namo expressed their dissatisfaction with the profit-sharing arrangement. The unhappy farmers thought that a 70:30 arrangement (70 percent for farmers and 30 percent for the company) would be more appropriate given that the farmers provide the main source of labor throughout the life of the tree. Therefore, many farmers hesitated to enter into the agreement with the company. On the other hand, the head of the District Agricultural and Forestry Extension Office (DAFEO) mentioned that the 60:40 arrangement allowed the company to recover initial investment costs, including the development of a processing factory and feeder roads to the plantations that would potentially provide benefits for other farmers and the district.

Other issues have arisen over the contract. There are discrepancies in the contract about stated rubber farming . in a single village or all of Namo District. Individual contracts for households were not developed. According to the existing contract, the Ying Jiu Pa Company seeks to plant rubber in a total of 6,700 hectares in the district. However, they are only approved to plant on 2,500 hectares during 2006-2009. The contract does not include a map indicating the area, nor an assessment of total land that was found suitable for planting rubber in the district. The contract also states that if the 2,500 hectares are not planted within the time specified (2006-2009), the district authorities have the right to nullify the contract.

Other aspects are unclear. The district government has the right to follow up, examine, and evaluate the environmental impacts of the contract rubber farming without further specifying the agencies nor the process for doing this assessment. So far, there has been no environmental or social impact assessment. The contract also says that the district government has the right to benefit from the investment of the company, without further clarifying what are the benefits. The company is supposed to provide social welfare, and secure health and safety of the company's workers. Part II, Article 2 of the contract serves to protect the two parties, the district government, and the company; however, protections of farmers' benefits are not clearly stated in the contract.

Source: Vongkhamor and others 2007.

C. Implementing Contracts and Concessions

Local authorities play a prominent role in the facilitation and management of such contract farming arrangements. The liaison function between the company and communities, and the endorsement by local and provincial officials is particularly critical in isolated and remote areas that have little experience with market-oriented private sector initiatives. The involvement of such local officials as district extension agents assures farmers of long-term technical assistance. At the same time, local authorities are urging farmers to participate in the contract farming schemes as a means to stabilize shifting cultivation and alleviate poverty. This mix of policy and market factors coming together in the phenomenon called the 'rubber boom' in the Northern Uplands.

It seems that in the case of maize production, the '2-plus-3' arrangements tend to be beneficial to smallholders because benefits accrue after one year and the farmers can opt out of the agreements. The agreements also seem to be better facilitated by local authorities through provincial contract farming associations. In the case of rubber plantations, the current contract farming arrangements could turn out to entrap asset-poor farmers who do not have the means to invest independently in rubber and have no other choice but to participate in these schemes. Generally, farmers appear to be well aware of these problems and often attempt to avoid participating in such schemes by investing on their own whenever they are able to do so.[17]

Provincial contract farming associations have been organized by local Lao investors in Houa Phan (and Champassak in the south) and registered with provincial authorities. Members of the association organize the contract farming of a selected crop (e.g., organic vegetables and Jatropha in Houa Phan) and obtain the sole right to purchase and market that crop in the province. The association has a set of principles and regulations that define the terms and conditions of contract farming, roles and responsibilities of each party, and the penalties to be imposed in case of evasion of terms. In Houa Phan, provincial officials, including administrators, technicians, as well as tax, police, and customs officials and district chiefs, have recently reviewed lessons learned from experiences with the contract farming companies and begun drafting principles and by-laws for provincial producer associations.

A provincial decree was recently signed by the provincial governor for the establishment of a producer association for the sole marketing of Jatropha. The association is attached to a foreign concession for 300 hectares of Jatropha, which will serve as a nucleus plantation. Fines are imposed on sellers and buyers who do not obtain permission of the association to trade Jatropha. Farmers are able to produce sufficient quantities of Jatropha for their own and community use, but sale of surplus must be offered to a registered member of the association. Creation of the associations is to protect Jatropha, organic vegetables, and other non-timber forest products from external traders. Such iterant traders are required to form joint ventures with members of the association to ensure fairness to farmers. The institutional capacity and strength of such associations has yet to be adequately tested. Provincial authorities and Lao investors are demonstrating a keen interest in reducing the risk of having raw materials, which they promote, sold to iterant Chinese, Thai, and Vietnamese traders and collectors who frequently depend on local Lao middlemen.

Village-based farmer marketing groups have been formed in some locations to facilitate contract farming negotiations and purchasing operations with Lao and foreign enterprises. Investors from Thailand have launched a maize promotion program in lowland areas of Khammouane Province in central Lao PDR. Facilitated by the agriculture and cooperatives office in neighboring Nakhon Phanom Province, Thailand, the intervention has organized farmers into marketing groups to produce maize for the company. Similar initiatives are planned for growing maize in Oudomxay and Xayabury Provinces in the Northern Uplands and for organic farming of soybean, cardamom, and broom grass in Bokeo, Luang Namtha, and Oudomxay by other foreign enterprises.

[17] As reported in the Vientiane Times on November 5, 2007: "Oudomxay rubber plantations fall short (…) Some farmers have not shown enough responsibility because they have planted other crops on the land for their own food."

Experience with marketing groups is mixed and their organization has not always succeeded. An example is Ban Na Yang, a Tai Lue ethnic village in Nam Bok District, Luang Prabang, where several Chinese and Lao-Chinese joint ventures have promoted maize, white sesame, groundnuts, and Chinese mustard for export to China. Each of these initiatives, organized through farmer marketing groups, has failed. The most frequent reason given is that the contracting firm did not return to purchase the produce even though, in some cases, the firms had provided seed and small quantities of chemical fertilizer on credit.

Role of local banks. Given the weak institutional capacity of the Lao banking, finance, and credit systems, banks currently play only a minor role in contract farming in Lao PDR. In Vientiane Province and Vientiane Capital City, and other peri-urban areas around major Lao towns, the Agricultural Promotion Bank has been active in providing short-term production credit to farmers producing crops for agro-processing facilities. In addition, between 1995 and 2003, smallholder farmers and investors in tree plantations were eligible to access credit from the Agricultural Promotion Bank to establish tree plantations through the Lao-Asian Development Bank (ADB) Tree Plantation Project.

Land concessions and lease arrangements for plantations. Concessions are typically granted by provincial authorities with little involvement and monitoring from the Central Government level. Only few foreign investors and land concessionaires receive their authorization for operating from Central Government authorities. Concessionaires usually use their own processing and transport equipment, and often import labor from outside. Concessions have become controversial because of conflicts over land use rights and land access. Large-scale land concessions consisting of areas over 1,000 hectares are found throughout Lao PDR but predominantly in central and southern Lao, including Khammouane, Savannakhet, and Champassak Provinces; and to a much lesser extent in the Northern Uplands in Oudomxay, Luang Prabang, and Xieng Khouang.

In some rubber plantations in the Northern Uplands, foreign or Lao enterprises are renting land from farmers and hiring farmers as laborers. Farmers may benefit from rental fees for land and, if labor is provided, also from a daily wage. Provincial officials however report that in many plantation areas, Lao labor is often not available to undertake the work of collecting the latex. As a consequence, Chinese investors have imported workers from China to collect and process the raw rubber.[18] A similar situation exists in some watermelon and vegetables plantations in Luang Namtha (Muang Sing) were there is a shortage of Lao labor and Chinese labor is imported. Land rental arrangements in the Northern Uplands extend over long periods of time, usually 20 years, and concessionaires can generally expect to earn significantly more than what is being paid in land rental fees. Land rental fees are paid in Lao kip, while latex is traded in Chinese Yuan.

Some concessions are operating as nucleus estates with technical outreach programs to farmers in nearby villages. Generally, an estimated 40 percent of the raw materials required by the concessionaire (for processing or to meet other contract obligations) are produced on the concession land. The remaining portion is often purchased from middlemen with quotas or directly from farmers. Although the concessionaire usually do not provide credit, technical assistance, or other support to farmers, traders with quotas from the concessionaire and processing companies will extend credit in cash

[18] Discussions with provincial officials in Luang Namtha and Oudomxay on March 3-5, 2007.

and/or in kind as an advance on the purchase of the crop. The major benefit to smallholders cultivating the same crop as the concessionaire lies in gaining market access so long as their product meets minimum standards specified by the concessionaire. The concessionaire benefits from reliable sources of raw material in close proximity to the plantation, which can be blended with produce from the concession.

Joint ventures. The formation of joint venture companies represents arrangements that allow investors to obtain some level of control over land to be used for production. Being part of a joint venture company, the Lao shareholder is generally allowed to operate the land for the joint venture. A number of Chinese and Lao individuals have formed such joint ventures for rubber cultivation and latex processing, but only a small number of such joint venture arrangements is registered with provincial authorities. Generally, the Chinese partner guarantees the market for the produce but not the price. The Lao partner benefits from a share of the income generated. The Chinese partner benefits from secure and steady raw material supply and control over the pricing arrangements but is usually required to provide all capital investment.

D. Provincial Market Pulls and Development Dynamics

Cross-border trade in the Northern Uplands has become a critical factor in provincial economic development since about 2003. Regional and domestic traders and agri-businesses increasingly take advantage of the strategic position of the Northern Uplands as an important production base for agricultural products in demand by the expanding markets in China, Thailand, and Vietnam and are sourcing food crops, agricultural raw materials, livestock, and non-timber forest products and other niche products. This trend that is taking place across the northern provinces is reflected in increasing diversification away from upland rice and farming specialization in a limited number of marketable cash crops. The most visible changes include the dramatic reduction in upland rice production (Figure 2)—indicative of the reduction of swidden farming in response to the Stabilization of Shifting Cultivation Policy—and the expansion of maize production areas (Figure 3) and rubber plantations over large parts of the Northern Uplands.

Figure 2. Reduction in Uplands Rice Production Areas

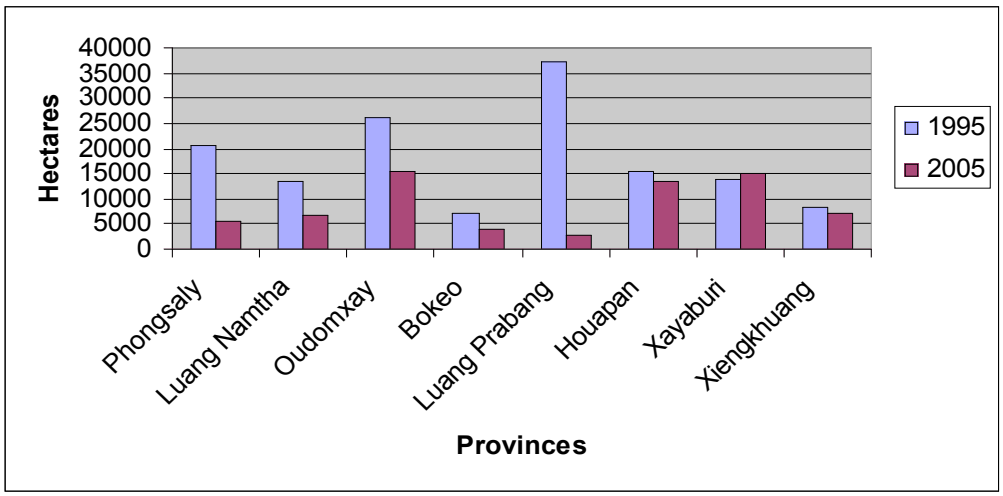
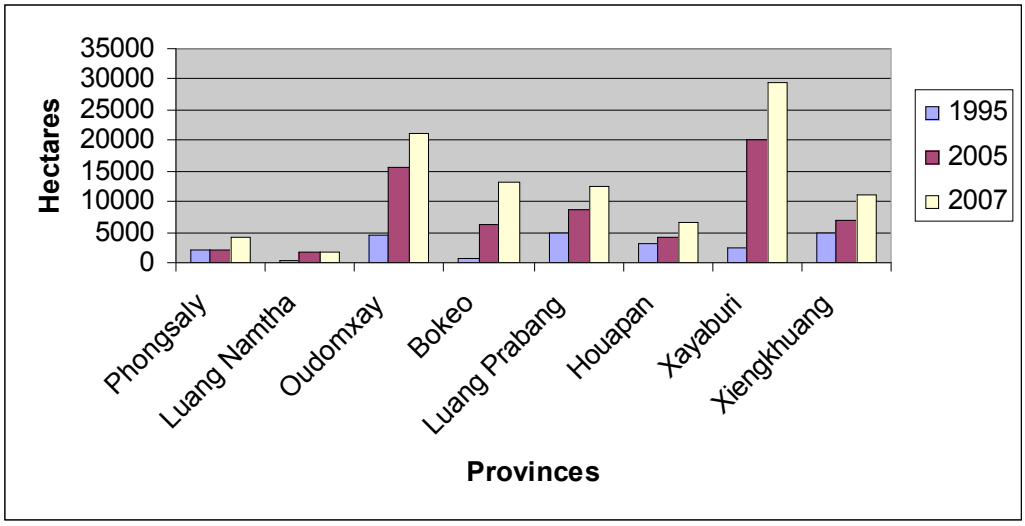


Figure 3. Changes in Maize Production Areas by Province



Provincial authorities are responding to these trade dynamics in different degrees but in general seek to use them to complement upland policy implementation.

Bokeo Province. Recent investments in road construction upgrading (Route No. 3) have improved the transportation links between Bokeo, on the border with northern Thailand and southern China and Thailand, and facilitated trade and investment. During 2007, 13,000 hectares of maize were cultivated, up from 6,400 hectares in 2005, with the main production areas concentrated in three districts—Ton Pheung, Huay Xay, and Pha Oudom. Expanded maize production is primarily in response to demand from the Thai market, which builds on traditional trade links and new border crossings, and has emerged as the dominant driver in promoting commercialized agriculture. Bokeo has promoted this expansion by exempting imported seeds from local taxes and by organizing farmers into maize producer groups that are registered at the DAFO level. Thai companies as well as Lao traders are purchasing maize directly from farmers, and the market has been able to absorb the expanded production without any marketing problems. In addition to traders from Thailand, Thai agri-business enterprises are investing directly through various contract farming schemes in the province.

Improvements and expansion in irrigation infrastructure, albeit small in scale, have further helped to improve the environment for farmers to diversify production into non-rice crops, particularly maize but also soybeans and groundnuts. Rubber in Bokeo is only of minor importance compared to other provinces as the demand pull from Thailand is less strong than from China. As reported by the National Agriculture and Forestry Research Institute (NAFRI 2006), the province has a target of 15,000 hectares of rubber of which only 700 hectares have been planted to date. Although individual farmers are beginning to plant rubber, no concessions for rubber plantation development have been granted to date.

Luang Namtha Province. Although some agricultural areas of Luang Namtha have access to the Mekong and market outlets in Thailand and Myanmar, upland agriculture development is being shaped by the province's proximity to southern China. The northern border districts of Namtha and Muang Sing represent the most developed areas in Luang Namtha, and good transportation and communications infrastructure facilitates access to Chinese markets as well as penetration of Chinese

entrepreneurs into the province. As a result, the production and supply of a small number of commercial crops to the Chinese market has become the highest development priority of the provincial authorities. While other provinces consistently articulate promoting food security, improving rice production, and promoting land allocation and forest protection as priorities in line with national policy goals and targets, Luang Namtha is deviating from this trend by directing its agriculture strategy exclusively toward supplying to Chinese cross-border markets.

One result of this strategy is that Luang Namtha has become one of the centers of rubber production in the Northern Uplands. As of mid-2007 approximately 18,800 hectares of rubber plantations have been planted, of which about 6,600 hectares were established in 2007 alone. Provincial administration collects an annual tax of 3-6 Chinese Yuan per rubber tree and requires potential investors to construct roads to those areas where concessions are being granted or where the firms intend to invest.[19]

Besides rubber, the provincial authorities are actively promoting the production of maize, tobacco, peanuts, sugar cane, rubber, cassava, Jatropha, organic vegetables, and livestock. As of mid-2007, 14 enterprises were registered with the Provincial Department of Planning and Investment and authorized to carry out contract farming operations. All of these enterprises are either Chinese or Lao-Chinese joint ventures. Two land concessions have been granted totaling approximately 1,600 hectares, of which 1,200 is for cultivating Citronella grass (*Cymbopogon marginatus; C. citratus*) and 414 is for producing rubber.

According to provincial authorities, the remaining poverty areas, including the districts of Viengphoukha, Nalae, Long, and Xiengkok, have so far been largely detached from the unfolding dynamics. Luang Namtha therefore pursues an active strategy to connect these districts to the vibrant northern border districts. A plan to upgrade the road to Long and Xiengkok Districts will link both towns more closely to Mouang Singh and the China border and promote the production of commercial crops. In addition, the completion of Route 3 will link Viengphoukha more closely to the provincial town and likely foster trade in the directions of both China (through Mouang Singh and Boten) and Thailand (through Ban Houei Xay).

Of some importance in northern Luang Namtha, cassava production is being promoted by traders from China. A Chinese-Lao joint venture is establishing a plantation of 1,000 hectares with a target of producing 22,000 tons of cassava, which is expected to yield 9,000 tons of chips for export to China. The longer-term plan is to cultivate 6,000 hectares of cassava in the province, with an outreach contract farming program to smallholder farmers. In addition, Luang Namtha, along with Phong Saly, has seen an expansion of sugar cane while other provinces have reduced their sugar cane production areas. Much of the sugar cane produced is being sold to processors in northern Thailand and China (Yunnan) and to Vietnamese traders.

Oudomxay Province. Oudomxay, located close to the Chinese border at the junction of Lao national Routes 1, 2, and 4, is an emerging agriculture trade hub in the Northern Uplands, similar to Luang Namtha.[20] Principal crops of the province are

[19]Lee Sing Ko Company (China) has constructed a market access road in remote part of Nalae District, where it has established a rubber plantation.

[20] Oudomxay's colorful history includes being a center for the illicit drug trade during the Lao civil war (1965-1975) and for a short period following the conflict. It was a base for Chinese military and civilian technical assistance to Lao revolutionaries during the civil war and the start off point for two major strategic military roads, namely Lao national Routes 1 and 6 linking southern Yunnan, China, to

maize, rubber, and cassava. In 2007, 21,000 hectares of maize were planted. With a provincial target of 30,000 hectares of rubber, 6,000 hectares were planted prior to 2007 and 2,000 hectares in 2007. In 2007, Oudomxay exported 100,000 tons of cassava to China, 30,000 tons to Thailand, and 20,000 tons to Vietnam. The strategic location of Oudomxay facilitates market links to China as well as Thailand. The principal crop producing areas are in Beng, Houn, and Pak Beng Districts, located along the recently (2004) upgraded Route 2W, from where agricultural produce is transported to China by truck through Xay and Naa Moh, and Ban Meo Jai Districts to the Phou Lak Kham traditional border crossing. Access to Thai markets is through Pak Beng District on the Mekong River where transport is by boat upstream to Chiangrai Province. Some produce is transported over land to the Thai border into Nan Province. Market pull from Thailand and Vietnam is expected to increase further with infrastructure improvements planned over the next 3 years, which will facilitate links to central Oudomxay. In addition, local demand for soybeans, maize, cassava, and other crops is expected to develop in response to recent Thai investments in a livestock feed mill at Tha Ngon District.

Twenty-seven Chinese, Thai, and other foreign investment companies are known to operate in Oudomxay under concession and contract farming arrangements. Of these, 19 are Lao or Chinese firms or Lao-Chinese joint ventures and are registered with the Oudomxay Provincial Department of Planning and Investment. Most of these firms are cultivating rubber on nucleus plantations with outreach programs to upland farmers. Some of the 19 firms and the remaining 8 firms operate contract farming or buyer programs for commercialized crops, including soybeans, mushrooms, cardamom, tea, maize, cassava, castor beans, orchids, and Eucalyptus trees. Some firms promote domesticated NTFP production of while others just purchase non-timber forest products.

Phong Saly Province. Phong Saly is a mountainous and remote province in the northernmost part of Lao PDR. It is populated almost entirely by ethnic minority groups and remains as one of the poorest provinces in the Northern Uplands. Provincial authorities pursue activities to alleviate poverty and promote the replacement of swidden farming, including irrigation development for paddy rice to improve food security; importation of improved hybrid rice varieties from China and Vietnam; and promotion of livestock. Swidden practices have been reduced from an estimated area of 26,000 hectares a few years ago to about 7,700 hectares in 2007. The enforcement of the Stabilization of Shifting Cultivation Policy has reportedly led to out-migration of upland communities (estimated by local authorities to be in the range of 1,000 to 1,200 people annually) to other locations and provinces where policy enforcement is less rigid.[21] Provincial authorities acknowledge that it will not be possible to halt all shifting cultivation by 2010.

Hand in hand with the Stabilization of Shifting Cultivation Policy and as market opportunities are seen to emerge, provincial authorities are promoting the production of selected cash crops in upland areas. Rubber is becoming more prominent as the province simultaneously seeks to meet market demand and to increase forest cover at 21 percent to 50 percent by 2010 by replanting degraded secondary forest areas with

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Viet Nam (via Xam Neua), and national Route 2, linking Yunnan to the Mekong River at Pak Beng District, and aimed at northern Thailand. Prior to 1975, Muang Xay was a district of Luang Prabang Province.

[21] These areas include Ban Nam Thouam, Nam Bak District, Luang Prabang Province; and Muang Sing District, Luang Namtha Province.

rubber. To date, 8,000 hectares of rubber plantations have been established, most of which have been planted during the last five years. Several village clusters have been designated by authorities to produce exclusively rubber.

Other important emerging cash crops include maize (4,300 hectares harvested in 2006), sesame, pigeon peas, watermelon, fruits and vegetables, tea (880 hectares), and domesticated non-timber forest products, namely galangal and cardamom.

Road and transport infrastructure in the province remain poor. Few roads are paved, and those not paved are impassable during the wet season. Although the road from the Chinese border at Ban Pakha to Phong Saly (68 kilometers) is paved and maintained, the 100-kilometer road from Ban Sin Xay through Boun Tai District to Ban Yo, Boun Nua District—the principal (and only) link between Phong Saly and the rest of Lao PDR—is difficult to travel in both the wet and dry seasons. As a result, market pull factors are not reaching as deep into Phong Saly as in other places although China and Vietnam are important destinations for agricultural products. Market pull from China is strongest in northern areas of Phong Saly, albeit with poorer penetration as compared to Luang Namtha and Oudomxay. In southern Phong Saly (Khoua and May Districts), market forces from Vietnam are more prominent. Coincidentally, the northern and southern areas are also ethnically different, with the northern areas being predominately of the Phou Noy ethnic group and southern areas being predominantly Khamou.

To date, Phong Saly has granted three land concessions to firms seeking to invest in rubber plantations, ranging from 2,000 to 14,000 hectares (although plantations have only been partly established). The concessionaires are required to assist the provincial government in the expansion of paddy areas and to finance the upgrading, expansion, and installation of irrigation systems (and other rural infrastructure) in exchange for investment and trade privileges. This approach is not unique to Phong Saly and is also applied in Luang Namtha Province (e.g., for road construction to Nalae District) and Houa Phanh Province (e.g., for village schools).

Xayabury Province. Xayabury's long land border with Thailand combined with traditional border crossings strengthens the Thai market as the dominant pull factor in agriculture commercialization. However, striking differences exist between the four southern districts of Xayabury—Kaen Thao, Boten, Paklay, and Thongmyxay— and the four northern mountainous districts of Khob, Xienghon, Ngeun, and Hongsa. For many years, the southern districts have been a center of cotton production for the Thai market. Reduced cotton yields due to insect infestations, requiring the need for costly insecticides, and declining demand from Thailand have resulted in a shift away from cotton to maize in recent years. Xayabury has now become one of the largest maize-producing provinces in the Northern Uplands—with 147,000 tons being harvested in 2007 as compared to only 5,600 tons in 1995—supplying maize nearly exclusively to markets in Thailand. Provincial targets for rubber are in the range of 50,000 hectares by 2010, of which less than 100 hectares had been planted as of late 2006. Two concessions have been granted.

For the northern districts, which are poorly connected to the Thai markets, ensuring food (rice) security remains a priority in combination with the promotion of livestock raising. Upland agricultural development in the northern districts, which were administered as a special security region in the 1980-90s due to political instability, is also constrained by isolation from other areas of the province and low production of food and agricultural products. Government plans to improve road infrastructure may

lead to further penetration of Thai traders into these upland areas in the future.

Luang Prabang Province. The city of Luang Prabang, a UNESCO World Heritage site, receives nearly one million visitors per year. Tourism infrastructure has increased greatly in recent years as has the frequency of scheduled flights throughout the Greater Mekong Subregion. These factors have created a market for quality food and agricultural products. In and around Luang Prabang, the response to this increased demand is visible with farmers expanding fruit and vegetable gardens and processing of traditional foods for Western and Asian tourists. Upland areas away from the city are however much less integrated into this market.

Luang Prabang has been subject to widespread deforestation through excessive logging in the past. Forest cover has been reduced to 18.2 percent, the lowest forest cover of any province in Lao PDR.[22] At the same time, the perception remains that swidden agriculture is a serious problem in this province with an estimated 16,000 hectares under swidden farming in 2007. In an attempt to increase forest cover, tree crops are being promoted by provincial authorities, including teak (approximately 22,600 hectares planted to date) and rubber. Two land concessions for rubber plantations have been granted totaling 25,000 hectares, of which 4,000 hectares have already been established. The provincial target has been set at 30,000 hectares. In addition to upland rice being the largest crop in the Northern Uplands (21,000 hectares in 2005), other important cash crops include maize, sweet potato, soybean, groundnut, and domesticated non-timber forest products.

The markets of Luang Prabang and Vientiane constitute the dominant pull factor for agriculture commercialization in upland areas in this province. Specifically, livestock is being produced in the uplands for markets in Luang Prabang, Vientiane Province, and Vientiane Capital. Principal markets for livestock also exist in Vietnam through Xieng Khouang Province. Although Luang Prabang shares a border with Vietnam, the border area is remote and mountainous on both sides of the frontier, and only one traditional border crossing point is open at a mountain pass at Na Son. The road to Na Son is not an all-weather road making access limited. The market pull from Vietnam is therefore constrained by poor infrastructure and few traders willing to pay the high transaction costs from travel and transport to Luang Prabang.

Luang Prabang, along with Houaphan, is the main production center for soybean. Total cultivation area has more than doubled during the past ten years from about 3,700 hectares to 8,100 hectares, and all expansion in Lao PDR has taken place in the Northern Uplands. Soybeans are primarily produced for the China, Thailand, and Vietnam markets, where demand for soybean is strong and growing.[23]

Xieng Khouang Province. Xieng Khouang is characterized by different agro-ecological zones but dominated by 200,000 hectares of denuded hills, the result of centuries of livestock grazing. Paddy rice production prevails on 20,000 hectares of lowland areas, but maize production has been expanding rapidly since 2005. Eastern Xieng Khouang begins to resemble southern Xayabury with maize dominating the landscape along the major highways and extending into upland areas. In 2006, an estimated 9,000 hectares of maize were harvested, which increased to 11,000 hectares

[22] *Northern Regional Development Strategy* (Committee for Planning and Investment & Asian Development Bank, March 2004).

[23] In 2003, Thailand imported 1.7 million tons of soybeans with an estimated value of US$458 million.

in 2007 compared to only 2,000 hectares in 2004. Xieng Khouang also has the highest reported number of cattle in the Northern Uplands.

Xieng Khouang has long historical links with Vietnam. The markets in Vietnam—which are much closer than Vientiane (400 kilometers) and Luang Prabang (250 kilometers)—are the main destinations for maize and livestock produced in the province. Lowland and upland farmers are responding vigorously to the demand for maize. Vietnamese traders are active throughout the maize growing areas, providing seed on credit to farmers and returning at harvest time to purchase the maize on the basis of informal contracts. With regard to livestock, several livestock trading networks exist, most which are dominated by the Hmong ethnic group that has links to members of the same ethnic group in Vietnam. The strong cross-border 'ethnic commercial network' of this group facilitates most of the trade in livestock with Vietnam, most of which remains unrecorded. The province however faces serious denudation of its hillsides and is experiencing an increasing shortage of grazing areas exacerbated by poorly developed knowledge for improving pasture land.

The provincial agricultural development strategy neither takes into account the vibrant maize economy in the province nor facilitates contractual arrangements between farmers and traders. The strategy also does not provide extension support to address soil degradation issues related to intensive maize production (which also applies to other provinces). It solely prioritizes livestock (cattle and buffalo) production; promotion of ecotourism (linked to the Plain of Jars); and the mining of minerals (gold and copper). In support of the expansion of livestock production, the PAFO has set a target of establishing 30,000 hectares of improved pasture by 2010, which appears to be unrealistic given the current progress in developing forage supply. Before 2007, there were 700 hectares of pasture land in the province, increasing to only about 1,200 by 2007.

Houa Phan Province. Houa Phan is one of the most remote and difficult regions to access despite Route 6 linking the province to Xieng Khouang and the rest of the country. Detached from the Mekong watershed, Houa Phan is located closer to Hanoi than to Vientiane. It remains separated from markets in Thailand and China, making it, like Xieng Khouang, almost entirely dependent on the demand of Vietnamese markets.

Farmers have been responding to this demand by growing maize, soybeans, sesame, pumpkin, mungbean, tea, non-timber forest products, and livestock. Houa Phan has some importance as a producer of cotton; but this is more in response to local demand of the traditional weaving industries in Xam Neua and Xam Tai Districts, renowned for their traditional silk and cotton textile products. Although Houa Phan is the poorest province in the north, it is self-sufficient in rice. Due to its mountainous conditions and isolation from other rice producing areas, it is likely that upland rice production will remain unchanged in the medium term, remaining between 13,000 and 15,000 hectares, which is about one-half of the area reported in 1990 and 1985, respectively. Although production of maize increased moderately between 1995 (3,000 hectares) and 2005 (4,000 hectares), other cash crops are likely to continue increasing in response to stronger demand pull from Vietnam. Similarly, the cultivation of soybeans, also with strong demand from Vietnamese agro-processors, is likely to continue expanding, already increasing by some 685 hectares (or some 40 percent) between 2003 and 2005.

The provincial leadership is well aware of the development challenges. Poverty

alleviation, phase-out of swidden agriculture, and promotion of agricultural commercialization remain the priorities of line authorities. The Stabilization of Shifting Cultivation Policy is being implemented but with some flexibility with regard to length of cultivation and fallow periods, primarily because productive land is scarce in the province, which in part is characterized by limestone geology, mountainous landscapes, and narrow river valleys. Maize and livestock production are the dominating production trends and are actively encouraged by the PAFO, which is more cautious than in other provinces due to the negative impacts of maize mono-cropping. Promoted as strategy to raise poor farmers' incomes, livestock production is also considered a means to enable rehabilitation of fallow forest land. Upland degradation is primarily being attributed to swidden practices while impacts of livestock on landscape-level dynamics appear to be poorly understood.

Several contract farming arrangements between Lao producers and Vietnamese traders are operating in Houa Phan, and the provincial government is taking an active role in their management. In Vieng Xay District close to the Vietnamese border, where contract farming is most prevalent, arrangements require the (a) registration of Vietnamese and Lao traders and enterprises (involved in contract farming) with Lao and Vietnamese district authorities; and (b) registration of contracts among traders, enterprises, farmers; community leaders (village chiefs), and district agriculture officials. The system includes measures for enforcement of contract obligations if producers and/or buyers do not meet contract requirements. By registering buyers with district officials on either side of the border, non-performing partners can be pursued and fined according to the contract.

Vientiane Province. Upland agriculture in the north of Vientiane Province, which is similar to its neighboring provinces in the north, benefits from good communications and transportation infrastructure that link it to Vientiane Capital about three hours to the south. The large urban market of the capital provides marketing opportunities for a wide variety of food and agriculture products. The demand pull from the Vientiane market is more influential than from the Thai market and includes the food processing facilities located in and around Vientiane. Agricultural crops being produced include vegetables, mungbean, peanuts, and maize. The trend is for the area cultivated in upland rice, sugar cane, and tobacco to decrease, while vegetables and maize are increasing (some 17,500 tons of maize was produced on 4,110 hectares in 2005).[24] It is expected that maize production will continue to expand in response to the pull from the nearby Thai market as well as from the re-opened livestock feed factory at Thangon District, Vientiane Province. Soybean production (only 380 hectares were harvested in 2005) is also expected to increase in response to an increase in feed mill demand.

About 60 percent of owned farmland is cultivated, the majority of which is devoted to vegetables. Survey results show an increasing importance of vegetables in the cropping systems since the area allocated to vegetables has grown from a mere 448 hectares in 1995, to nearly 12,000 hectares by 2005.[25] Farms are located usually near all-weather roads with an approximate distance of 1.4 kilometers and about 3.1 kilometers away from the nearest input market. This increase in vegetable production

[24] *Agricultural Statistics, 30 years, 1976-2005* (Ministry of Agriculture and Forestry, Lao PDR, April 2006).
[25] *Agricultural Statistics, 30 years, 1976-2005* (Ministry of Agriculture and Forestry, Lao PDR, April 2006).

is in response to increased food consumption by a rapidly growing local population in both Vientiane Capital and Vientiane Province and the large influx of tourists, an estimated 2 million annually. In addition, several food processing facilities have been established in Vientiane Capital and Vientiane Province that require a consistent supply of high-quality vegetables for processing and export to Thai, Japanese, Korean, and European markets.

E. Concluding Remarks

As shown, the market pull in the Northern Uplands is increasingly supported and subsidized in a number of different ways through opportunistic approaches at the local level, while a regulatory framework to govern private sector investment within the Government's poverty alleviation and agriculture commercialization framework is virtually absent. Existing policies focus on regulating smallholder livelihoods and market participation while no policies govern commercial private sector investment activities. At the same time, the Government, particularly the role of the Ministry of Agriculture and Forestry, remains focused on pursuing production targets instead of redefining its role a facilitator and negotiator. Government is also trying to provide services to farmers that the private sector is already providing. As an outcome, the current and future distribution of benefits, which are created in these arrangements, is presently not well documented or understood, and the long-term implications for poverty alleviation (especially for disadvantaged groups); the environment; and issues, such as in- and out-migration, are generally unclear.

Table 3. Production of Selected Crops in the Northern Uplands, 2005 and 1995

Province	*Crop production (1,000 tons, rounded)*						
	Rice		*Soybean*	*Maize*	*Peanut*	*Sugar cane*	*Cotton*
	Upland	*Lowland*					
Phong Saly							
2005	10.7	33.5	0.29	9.17	0.50	21.1	0.19
1995	28.5	12.3	0.63	4.00	1.03	0.63	0.07
Luang Namtha							
2005	12.8	47.6	0.04	7.55	0.02	54.3	0.00
1995	22.7	20.3	0.10	1.26	0.06	10.5	0.09
Oudomxay							
2005	35.1	47.0	0.44	70.87	1.21	6.50	0.04
1995	42.5	27.8	0.53	6.58	0.86	3.58	0.40
Bokeo							
2005	8.6	52.7	0.38	30.1	0.64	0.00	0.02
1995	12.9	24.8	0.16	1.27	0.08	1.63	0.10
Luang Prabang							
2005	39.6	52.0	4.70	38.1	2.21	0.60	0.17
1995	66.4	22.9	0.18	6.62	0.87	2.46	0.60
Houa Phan							
2005	25.2	53.1	2.75	17.35	0.76	7.80	0.36
1995	28.1	29.2	0.80	4.50	0.68	7.00	0.45
Xayabury							
2005	31.4	108.6	0.24	92.6	4.99	2.95	0.07
1995	25.4	62.0	0.26	5.63	2.40	8.13	6.00
Xieng Khouang							
2005	15.2	64.0	0.49	30.28	1.06	0.00	0.00
1995	13.5	32.9	0.13	8.71	0.33	7.38	0.04
Vientiane							
2005	2.8	187.3	0.45	17.53	1.68	5.80	0.07
1995	7.8	75.9	0.02	1.83	0.32	2.95	0.30
Northern Uplands							
2005	181.4	645.8	9.78	313.55	13.07	99.05	0.92
1995	247.8	308.1	2.81	91.07	6.63	44.26	8.05
Lao PDR							
2005	214.8	2,082.1	11.10	372.56	26.99	196.10	2.00
1995	296.1	1,071.3	4.84	50.38	8.44	62.33	8.80

Source:, *Agricultural Statistics, Year Book, 1975-2005* (Ministry of Agriculture and Forestry, Department of Planning,

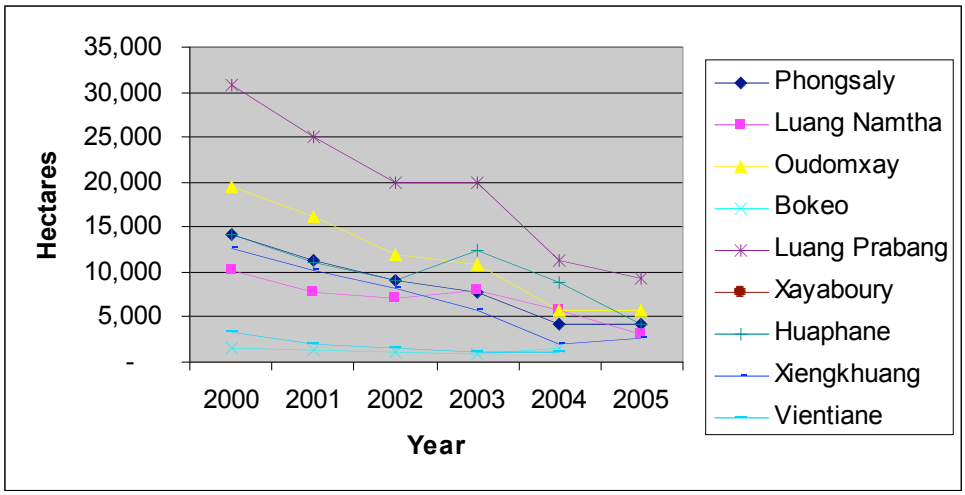
V. TRANSITION OUTCOMES: LIVELIHOODS AND SUSTAINABILITY

Between 2001 and 2005, more than 1.09 million hectares of arable land and 3.6 million hectares of forestry land were allocated to about 420,000 households in 7,125 villages with the objective "to reduce the practice of shifting cultivation while ensuring sedentary highland and lowland cultivation to reduce poverty among the ethnic people." During the same period, shifting cultivation practices were reduced from 118,900 hectares in 2001 to 29,400 hectares in 2005, mainly in the Northern Uplands, and the number of households practicing shifting cultivation was reduced from more than 140,000 in 2000 to less than 45,000 in 2005.[26]

A. Coping Strategies and Transition Dynamics in Upland Production Systems

Traditional swidden agriculture has been disappearing in the Northern Uplands over the past years (Figures 4 and 5); the ongoing reduction in area, where this type of land use is still being practiced, is a direct response to the existing policy framework. With significant policy implementation progress, swidden practices have been giving way to new permanent agriculture and other land uses, which are still evolving. Upland farmers have responded with different coping strategies to accommodate the restrictions posed by Government policies. And, where possible, the farmers have simultaneously responded to opportunities brought about by regional market demand.

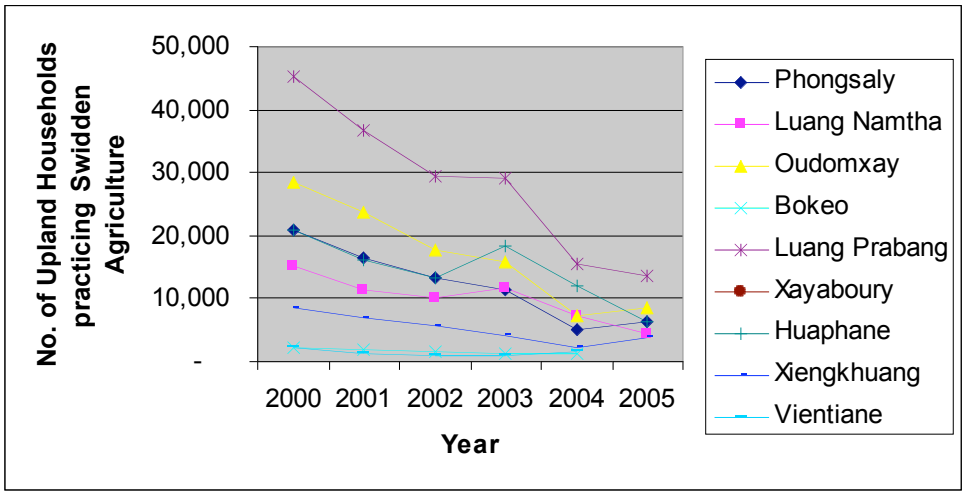
Figure 4. Reduction of Swidden Agriculture in the Northern Uplands 2000-2005



Source: Department of Forestry Ministry of Agriculture and Forestry.

[26] Data from Department of Forestry.

Figure 5. Decrease in Upland Households Practicing Swidden Agriculture



Source: Department of Forestry Ministry of Agriculture and Forestry.

The two main coping strategies appearing across the Northern Uplands include the introduction of annual and perennial cash crops into previous upland rice farming systems and, often simultaneously, the intensified production of large ruminants. These two strategies have resulted in the accelerated and permanent conversion of previous fallow land and young secondary forests into permanent cropping and grazing land. Also in response to the upland policies, farmers have shortened or abandoned fallow and regeneration periods on the cultivated agriculture land and intensified cropping on smaller areas concentrated around settlements. Although some former fallow land distant from settlements is thus allowed to regenerate back into natural forest, areas now under permanent cultivation show signs of soil degradation and declining yields. Field observations indicate that the intensification of annual cash cropping on smaller plots, the expansion of industrial tree plantations, and intensified livestock production are generally not reducing pressure on the upland environment and the intended introduction of sustainable land use practices, following the elimination of swidden agriculture, is not happening. In fact, the shift from extensive agro-forestry land use patterns to intensive permanent agriculture on sloping lands raises concerns about land degradation and sustainability in the longer term.

In areas where good infrastructure facilitates temporary migration, farmers often pursue off-farm income-generating opportunities when farm labor requirements are low. Out-migration and off-farm employment could lead to an initial regeneration of fallow land and secondary forest, but these areas are beginning to be claimed by colonists (often through fencing of land) and being transformed into industrial plantations (e.g., Vientiane). The resulting decrease in population density reported by local authorities in some areas will most likely lead to natural regeneration of fallow and secondary forest areas into permanent forest (e.g., in Phong Saly).

The following discussion attempts to capture some responses of farmers to policies and transition dynamics along the typology of agriculture systems presented in Chapter II. The transition dynamics of different uplands production systems are summarized at the end of this section in Table 5.

Traditional swidden agriculture systems (Group I) continue to be practiced over approximately 20-30 percent of the most remote parts of the Northern Uplands. While market pull factors in these areas are of nearly no relevance yet, the transition is about

to be set in motion through continued policy implementation. Implementation of the push framework is possible through political party and administrative structures, which are much less dependent on road infrastructure and population density and can reach areas with poor or no infrastructure access. In addition, there is presently no apparent market demand for products from these remote swidden agriculture systems, including non-timber forest products (with opium probably being the only exception), which reinforces market isolation and prevents upland communities from exploring coping or alternative livelihood strategies (Box 4).

Box 4. The Low-Market Demand for Non-Timber Forest Products

The potential of non-timber forest products (NTFP) to provide substantial and sustainable income is limited. Non-timber forest products in Lao PDR are a 'safety net' in supporting basic needs of upland farmers, providing food in times of rice shortages, especially for swidden agriculturalists, and contributing to rural cash income. Foppes and Ketphanh (2004) and Yokoyama (2004) describe the role of non-timber forest products for the livelihoods of Lao upland communities both in terms of subsistence use and cash income. Upland farmers spend more time per year on gathering non-timber forest products than in swidden agriculture. However, the collection or cultivation of non-timber forest products is not seen as an alternative to swidden agriculture because both are closely related and part of the same local knowledge systems. Swidden agriculture creates a mosaic of vegetation types that are essential for the availability of most non-timber forest products.

A study of 232 households in Phong Saly shows that income from non-timber forest products remained stable or slightly declining from 1996 to 2005 over different income groups. All households were faced with income reduction due to elimination of opium cultivation and able to compensate this income loss only through cash crops, livestock, and off-farm income. This illustrates that most non-timber forest products do not have potential for cash income development and employment generation.[a]

There are limited non-timber forest products with economic potential, such as broom grass (*Thyrsanolaema maxima*), sweet palm fruits (*Arenga westerhouttii*), paper mulberry (*Broussonetia papyrifera*), benzoin (*Styrax tonkinensis*), peuak meuak (*Boehmeria malabarica*), eaglewood (*Aquilaria sp.*), bitter bamboo (*Indosasa chinensis*), and cardamom (*Amomum sp.*). But there are important limitations in developing these products as enterprises, including market accessibility and transaction costs in remote areas and limited capacities. Where benefits have accrued, more powerful actors tend to appropriate them. The factors that limit development of forest products are the very same structural and political/economic conditions that have marginalized rural populations.

After early enthusiasm over NTFP potential for poverty alleviation and conservation, there is a mounting body of literature and case studies that question the prospects of NTFP commercialization. A study of 61 cases in Asia, Africa, and Latin America implies that selling products from unmanaged natural forests have helped lift people out of poverty at times (Ruiz-Perez and others 2004a). Belcher and others (2005) conclude that "it is simplistic, and often wrong, to assume that because an NTFP is important to the poor, efforts to develop it will help the poor." In general, NTFP management remains a highly unpredictable occupation for local forest-dependent communities (Michon 2005: 20-6). NTFP markets are often fluctuating and thin, meaning that a small reduction in supply has a large effect on quantity marketed (Ndoye 2005: 14-9). One way to limit the effect of thin markets is to improve the supply through domestication methods, which is happening in Lao PDR for most of the main non-timber forest products with potential mentioned above. This might however involve the risk of excluding poor people who have collected these products from the wild.

Other issues include the problems of sustainable harvesting rates of non-timber forest products (aggravated by fluctuating markets that cause opportunistic harvesting practices); lack of community control over resources; counterproductive accumulation of local, national, and international regulations for management and harvesting; non-transparent systems of fees and taxes; and lack of market information. Even in existing NTFP markets, some of the common poverty-related issues prevail. Low returns are usually obtained by producers/harvesters in comparison to those of intermediaries and trading specialists.

[a] Results of an impact assessment of the Phong Saly Development Project on rural livelihood in the District, IRAM, 2006, provided by Agence de Développement de France.

The farming practices are embedded into a complex system of traditions, customary tenure, lifestyle, rituals and perceptions, gender roles, and community social interactions. Consequently, the impact of policies expands to socio-cultural systems and entire livelihoods, often resulting in hardship and suffering and raising serious concerns about food security.

The Land and Forest Allocation Program is the primary policy vehicle through which the traditional systems are impacted and therefore needs specific attention if policy outcomes are to be evaluated. Targeting LFAP objectives, the Land Law of 1997 specifies the promotion of sustainable management and use of natural resources and of commercial agricultural production; and the prompt reduction and gradual elimination of shifting cultivation. These objectives are based on the recognition that clear and secure land rights would provide incentive to cultivators to make productive investments in their land. Land Law article 17, Determination of Scope of Agricultural Land Use Rights, illustrates the schematic LFAP approach. The state authorizes individual and household long-term and efficient land use in conformity with plans and objectives determined for the specific area. In fact, the LFAP reduces land availability through restricting farmers' access to forest areas by zoning the village land into agricultural and forestry land categories. Each household labor force is allotted usually 3-4 plots of a total area, not exceeding 3 hectares of which the household is supposed to cultivate only 1 or 2 plots per year and allow for at least a 2- to 3-year fallow period.[27] Contrary to the original intention, farmers often use all their allocated land at the same time and for permanent cultivation. Box 5 provides a case study in Vietnam of land and production development based on the values and culture of a village community.

Households can also be allocated forest land.[28] Fallow areas are identified as degraded or destroyed forest rather than as a phase in an agricultural cycle. Since *land abandoned* for five years or more is reclassified as *regeneration forest*, there is additional pressure not to allow forests to regenerate and shorten the swidden agriculture cycle (Thomas 2005: 18-23).

The LFAP concept and policy approach to permanent agriculture in the Northern Uplands is based on lowland notions and uses of land. Paddy cultivation, gardens, orchards, and plantations are acknowledged as the only land uses that deserve titling. Swidden techniques, foraging activities, hunting, and gathering are either underestimated or simply ignored in their importance for upland livelihoods. It is important to note that the LFAP temporary land use certificates are issued to upland farmers only if they meet the 'permanent criteria' of land uses, and upland farmers have little or no choice but to comply with the land use restrictions and to change their production system.

[27] Land Law article 17 states household land allocation per labor force: 1 hectare for rice cultivation, 3 hectares for commercial crops, 3 hectares for fruit-trees orchards, and 15 hectares for livestock forage production.

[28] Land Law article 21 states household allocation per labor force of forest land (deforested land or degrading land) of 3 hectares.

Box 5. Community-Based Development among the Black Thai in Northwestern Vietnam

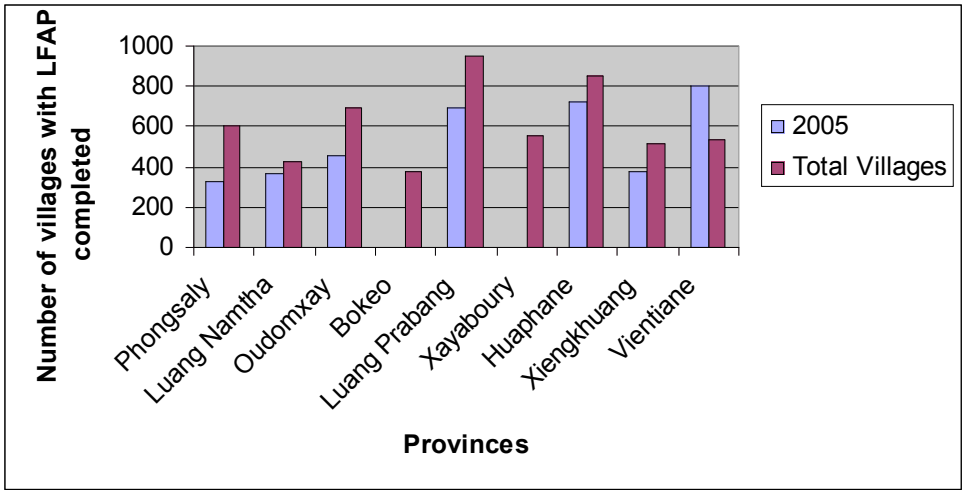
A 1999 case study from Vietnam by T. Sikor and Dao Minh Truong shows that agricultural development has been shaped by traditional village institutions and rules that express customary ways of production and social behavior in the communities. Some village institutions reflect national policy, while others differ significantly from it. These institutions have expressed the underlying and specific values and culture of the village communities.

Village tenure institutions have shaped formal land allocation. Households were usually allocated all the upland fields they had worked before. Village institutions also continued to re-allocate paddy fields every 5 years to adjust for changes in labor capacity in contrast to the long-term allocation stipulated by the state. Land allocation did not have much effect on land tenure within the villages. It also did not produce the land registry desired by the state because actual land distribution is much more fluid and flexible than allocation presumes. For example, the boundaries between adjacent plots tend to vary between the years as the households re-negotiate every year. Households also exchange or divide plots without reporting the changes. Village rules, not land use certificates, thus regulate land tenure and shape household land holdings within the villages. Land allocation has however led to a clear demarcation of boundaries between villages and was considered a positive move as it excluded outsiders.

Village institutions also continued to guide the use of forest resources in the villages. The traditionally applied categories differ from the state-issued classification system. However, villages have received forest protection contracts from the state and managed to re-distribute the benefits of the financially attractive protection contracts among themselves. Not only agricultural output increased rapidly but it was also distributed in a relatively equal manner among households. Differentiation among households has not changed because today as in the past, village institutions make household wealth largely dependent on labor capacity.

The LFAP implementation is already far advanced in the Northern Uplands. Most of the provincial governments in the Northern Uplands have almost completed the first round of the LFAP activities and results are presently being reviewed within Government. The slowest progress is being observed in Phong Saly Province with LFAP implementation in about 50 percent of the upland villages so far (Figure 6).

Figure 6. Progress of LFAP in the Northern Uplands



Source: Department of Forestry.

Implementation of the Stabilization of Shifting Cultivation Policy is generally advanced as well. However, some provinces are experimenting with different approaches to implementation of the policy as the imposed restrictions are being increasingly recognized has hardships for upland communities. For example, in Luang Prabang, a village is declared 'free of shifting cultivation' if 70 percent of its households have 'stabilized' their cultivation patterns and thus some continuation of swidden farming is acceptable. In Phong Saly, swidden agriculture will be allowed to continue in remote locations because it is well understood by local authorities that there is currently no alternative to livelihood and food security.

Fixed rotational cropping systems (Group III) and intensified production of large livestock (Group VIII) are emerging forms of land use widespread throughout the Northern Uplands. Both systems are response phenomena to the policy push-factor framework in the first place. Fixed rotational cropping meets the LFAP requirements and has often led to the nearly complete elimination of the fallow periods with more negative impacts on soil fertility and erosion as compared to the traditional swidden agriculture system. Intensified livestock production, especially the raising of cattle and goats, is an ideal strategy for upland farmers to circumvent the farming restrictions posed by the Stabilization of Shifting Cultivation Policy. Free grazing livestock can access land that is no longer accessible for swidden farming and has been classified as regeneration forest. As large ruminants can be grazed on land even outside village boundaries, it is an effective way to utilize land for productive purposes despite the restrictions put forward by formal land zoning.

While it is fully recognized that livestock has always been an important asset to the upland household and an important element in the household economy, the major increases in livestock numbers in the Northern Uplands—although difficult to estimate because of the informal elements of the sector—can be seen in the context of the swidden land use restrictions posed by the upland policies. The environmental impacts of the now widespread trend of former fallow becoming grazing land are direct outcomes of LFAP and the Stabilization of Shifting Cultivation Policy. These impacts also need to be taken into consideration when expanded livestock production is being promoted. Livestock production is now increasingly being driven by domestic and regional market demand. In 2002/3, about 87 percent of rural households in the Northern Uplands engaged in large livestock production, but key constrains to commercialization remain when considering animal diseases, lack of vaccination programs, and lack of high-quality feed resources.[29]

Modernized rice-based agriculture (Group IV), annual cash crop production in monocultures (Group V), and industrial plantations of perennial crops (Group VII) represent market-oriented farmer production decisions. The market pull, reinforced by the Government's agriculture commercialization efforts, is driving the expansion of these production systems. Cash cropping and tree plantation development appear to experience a much higher tolerance of local authorities with regard to expanding into forestland categories as compared with upland rice cultivation; and the systems are also allocated more land under the LFAP. Moreover, plantations of rubber, teak, eucalyptus, eaglewood, and others are contributing to the Government's goal of replanting 500,000 hectares of forest nationwide by 2020.

[29] Review of the Livestock Sector in the Lao People's' Democratic Republic (International Livestock Research Institute 2002).

While most of the emerging cash crop systems throughout the Northern Uplands are monocultures,[30] ***cash cropping in diverse agro-forestry systems (Group VI) and modernized rice-based agriculture (Group IV)*** in valley bottoms tend to reduce pressure on uplands and lead to a higher forest cover in the surrounding areas. However, both systems are small in scale compared to the now dominant crop monocultures and livestock production.

A case study from Luang Prabang illustrates that out-migration, reduction of swidden agriculture, introduction of cash crops, and intensification of cultivation on a few plots are simultaneously occurring in Samton Village (Table 4).[31] While shifting cultivation areas are being reduced and household are leaving the village, upland rice is slowly being replaced by other crops, such as maize and cassava. However, upland rice remains the primary staple, accounting for 89 percent of the total land area. The distribution of the shifting cultivation areas shows that villagers obviously discuss and allocate clusters of farming land on an annual basis to groups of households. These clusters are shifting around within the village boundaries using the total available area (approximately 1,500 hectares), except the community forest area (112.4 hectares). Within these clusters, the households have generally 3 to 4 plots assigned. Between 2005 and 2007, several villagers rented plots from the neighboring village, but the number of cultivated plots outside the village boundary are decreasing. Institutional mechanisms are still used in the village, and farmers discuss and agree on plot locations.

Table 4. Basic Information on Shifting Cultivation in Samton Village 2005-2007

	2005	***2006***	***2007***
Total area of shifting cultivation (ha)	152.4	110.6	111.4
Upland rice area (ha)	142.3	108.4	99.2
Other crops area (ha)	10.1	2.2	12.2
Average shifting cultivation area per household	1.7	1.4	1.4
Total number of households	88	81	80
No. of households practicing shifting cultivation	82	73	76
No. of shifting cultivation plots	127	96	109
No. of upland rice plots	96	90	80
No. of other crop plots	31	6	29

[30] Only maize monoculture production faces some restrictions through policy regulations (Prime Ministerial decree on application of conservation agriculture), which are weakly enforced.

[31] JICA project FORCOM (Namura and others 2007), On Patterns of Shifting Cultivation in Samton Village, Viengkham District, Luang Prabang Province.

Table 5. Transition Dynamics of Different Uplands Production Systems

	Pull and push factors	*Poverty impacts and social issues*	*Environmental outcomes*
Traditional systems			
I. Swidden farming	Pull factor generally weak due to remoteness; current crops not attractive for markets; small income generation from wild NTFPs, timber, and wildlife. Push factor by restricting land access through LFAP. Different provincial implementation practices leading to adapted phasing-out schemes.	Food security concerns in areas where push is starting or increasing and at the same time the pull factor is negligible and thus not providing alternative income-generating opportunities.	Low impact: Traditional swidden agriculture is still sustainable form of upland agriculture in many locations where population densities are low.
II. Paddy-based rice cultivation	Pull and push not relevant. This system not perceived as a problem and no specific policies apply.	Good market access makes diversified agricultural production possible. Access only by lowland ethnic groups.	Low impact: little pressure on uplands leading to a higher forest cover in the surrounding area.
Emerging systems			
III. Fixed rotational cropping (mainly of upland rice)	Strong push against swidden agriculture by restricting land access, LFAP, Village Cluster Development, etc. Pull and push factors both promote introduction of cash crops other than upland rice. Extent of diversification depends on market access and lower transaction costs. Push factor aims at area reduction whereas market pulls for an increase in total area.	The success of coping strategies depend mainly on assets of individual households, functioning community, and land availability.	Declining soil fertility and yields, increased erosion. Problems with high weed infestation lead to use of herbicides.
IV. Modernized rice based agriculture in valley bottoms	Pull and push factors coincide: market demand for rice on one hand, irrigation and extension support on the other hand.	Transition to the intended 'modern' agriculture is well under way. Access only by lowland ethnic groups.	Low impact: little pressure on uplands leading to a higher forest cover in the surrounding area.
V. Annual cash crops in monocultures	Strong pull for cash crops mainly as a function of infrastructure (market access). Policy push through commercialization goals. First attempts to introduce technological innovations such as conservation agriculture (Prime Ministerial decree).	Initial high returns and improved livelihoods for most farmers. Long-term economic risks.	Mostly negative on plot scale. Still limited at landscape level with few exceptions.
VI. Annual and perennial cash crops in diverse agro-forestry systems	Systems emerge in areas where diverse pull factors occur and farmers/traders have different markets to chose. Push is exerted mostly through donor projects that provide initial financial and extension support (German Agro-Action model).	Evidence of several success stories, especially with Khmu farmers. However, not all households can sustain their livelihoods in this way.	Positive. Diverse agro-forestry systems with a higher sustainability.
VII. Industrial plantations of perennial crops	Pull and push coincide. Foreign companies are interested in land concessions and '2-plus-3' contractual arrangements. At the same time, push for tree planting to comply with policy to increase forest cover. Industrial plantations of these species are classified as forest. Emerging push to balance the rubber boom by introducing fiscal policy and ceilings (Bokeo, Luang Namtha, Oudomxay Proviences)	Low impact yet due to long-term benefits. Will lead to strong economic differentiation between winners and losers.	Negative on plot scale and smaller watershed level. Serious landscape-level changes would only occur if in-migration of labor takes place at large scale.
VIII. Intensified production of large livestock	Initially, a response to push factors, now pull and push strongly coincide due to high domestic and regional market demands for meat. At the same time, livestock raising is promoted by PAFOs and DAFOs as an alternative to swidden agriculture, and by donor projects as a poverty reduction measure.	Positive: helps farmers to cope with the restriction of land access (through free grazing practices) and by using income from livestock sale for buying rice.	Negative at plot and landscape level. Overgrazing leads to serious land degradation and savannazation.

B. Winners and Losers in the Uplands Transformation

As policy implementation outcomes become more apparent, it is important to gain a better understanding of the types and groups of households that tend to gain and lose in the transition of production and livelihood systems. In the absence of a sufficiently detailed and up-to-date database, this section is based on some theoretical deliberations on likely household development paths based on asset endowments.[32] Describing the asset base of rural households and understanding how assets and their mix contribute to performance of different livelihood strategies could be useful in discussing policy implementation adjustments and support options to households with certain common characteristics.

Household asset portfolio. In general, the household asset portfolio determines which livelihood strategy the household will choose in the transition and whether the household can successfully apply this strategy. Of particular importance in the portfolio is household location, which will determine the likelihood and costs of transacting in markets. In addition, a household's human, physical, and social capital are important determinants of market participation. The institutional environment also plays an important role. Traditional village and community institutions are able to govern household land holdings, even within the formal process of land zoning and allocation, by regulating access to land and other resources, re-negotiating plot boundaries, mediating in land disputes, and decision making in benefit re-distribution.

Households can be grouped along these asset components, as illustrated in Table 6. The proposed livelihood framework (DFID 1999) includes the following asset types: (a) geographic determinants of comparative advantage (including population density, road density, and market access) (b) natural capital; (c) human capital; (d) financial capital; (e) physical capital; and (f) social capital.

Determined by a descending scale, the household types are designated as type-A through type-E. Referring to Table 6, comparative advantage includes the level of remoteness of upland households with Type-A indicating high population density and market access; and Type-E indicating low population density and poor market access. The same descending levels are applied to financial, physical, and social capital, and similar levels applied to natural capital (high to low security and stability) and human capital (conducive to non-conducive) .

In the uplands transition, natural capital of households is primarily determined through the push-factor framework. The Land and Forest Allocation Program might decrease access to land, the Stabilization of Shifting Cultivation Policy might reduce long-term quality of crop land, and the Village Cluster Development can lead to changes in the size of land holdings and land tenure and insecurity. Household types A, B, and E are characterized by stable access to and sufficient quality of land combined with secure tenure, while households C and D experience restrictions in land access, reduced quality of land, and increasing insecurity of tenure depending on the institutional environment.

[32] See comparable studies in Nicaragua (World Bank 2004) and in Honduras (Jansen and others 2006).

Table 6. Household Types with a Mix of Assets

Household type	***Comparative advantage*** [a]	***Natural capital*** [b]	***Human capital*** [c]	***Financial capital*** [d]	***Physical capital*** [e]	***Social capital*** [f]
A	High	High, stable, secure	Conducive	High	High	High
B	Medium/high	Medium, stable, secure	Neutral	Medium/High	Medium	Medium
C	Medium	Medium/high, decreasing, secure or insecure	Conducive / not conducive	Medium	Medium	Medium
D	Low/medium	Medium/high, decreasing, insecure	Not conducive	Low/Medium	Medium	Medium
E	Low	Medium/high, stable, secure	Not conducive	Low	Low	Low

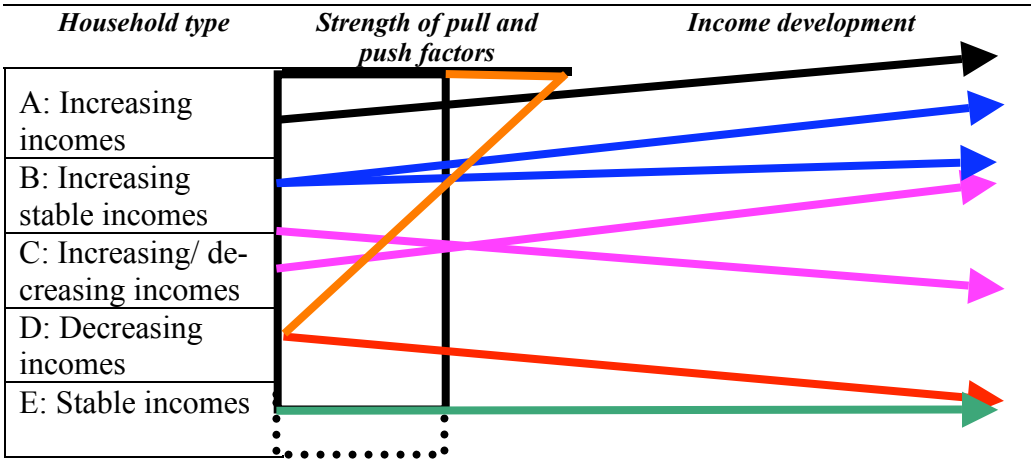
[a] Population density, roads, market access.
[b] Land, tenure security.
[c] Household size, composition, skills, ethnicity.
[d] Cash, credit, savings, livestock.
[e] Machinery, equipment.
[f] Village organizations, producer organizations.

Production decisions are also depended on a household's human capital.[33] Knowledge and skills rather than formal education determine production and livelihood decisions as the household usually undertakes the familiar. For example, the collection of non-timber forest products is based on specific indigenous knowledge of ethnic groups. The ethnicity of a household strongly influences the perceptions and views of a household. Assets that might have been very beneficial in the past may render obstructive in the new context.

Figure 7 illustrates possible trajectories of income and livelihood security development (including income from subsistence production) in the uplands transition.

[33] Literate households are 9 percent more likely to make crop sales and 4 percent more likely to own a non-farm business. Wealthier households are significantly more likely to sell crops and are also more likely to own a non-farm business. Ethnic Lao households are 6 percent more likely to sell crops and also more likely to own a non-farm business (World Bank, 2006 Linking Farmers to Markets – Background Paper by Hill, R.V. and Christiansen, L.

Figure 7. Different Income Development of Households Types



Note to Figure 6. The push factor, represented by the black rectangle, is of constant strength for all households of type A to D. It only decreases in strength in very remote locations (i.e., type-E, the 20-30 percent of upland areas where the LFAP has not yet been implemented). Only household A, B and C are able to benefit from market opportunities (decreasing strength of the pull factor indicated by an orange triangle) while those opportunities are negligible in remote areas with low to medium population density and weak infrastructure.

The principal outcomes in terms of income and livelihood security for the 5 types of households are thus as follows:

Type A and B households will likely benefit in the transition to a market-oriented agriculture sector or at least are unlikely to experience livelihood security problems.

Type C households can be either winners or loser. Those are households that are facing restrictions in land access and crop production but have opportunities of generating alternative incomes either in the farm or non-farm sectors. Success is likely to depend on functioning community institutions.

Type D households are likely to lose in the transition simply because they are lacking market opportunities to cope with restrictions by the push factor. In other words, they represent a group of households where the Government's objectives of commercialized agriculture do not materialize. It is primarily this group of households that shows different response phenomena to policy restrictions, including the (a) shortening of rotations for upland rice production, with emerging use of herbicides for increased weeding requirements; (b) splitting up of the household into a group that lives in the village cluster and a group that returns to the old location to cultivate the original plots; (c) out-migration to other areas or provinces.

Type E households, which are just 'left alone' without push and pull factors, will probably not change in terms of income; however, as soon as they are reached by the push factor, their unfavorable asset endowment will cause them to transit into type-D households.

A case study conducted in Phong Saly Province on household income development

between 1996 and 2005, following the implementation of the Land and Forest Allocation Program and Stabilization of Shifting Cultivation Policy, confirms the above generic livelihood trajectories.[34] Households that switched to off-farm labor and annual cash crop production significantly increased income during this period. Households, which intensified upland rice production but diversified only little into cash crops, were able to maintain stable incomes. Those households that produced comparably higher amounts of upland rice and opium in areas away from markets were not able to maintain previous incomes and compensate for the losses incurred through the shifting cultivation stabilization and opium eradication programs, even through other livelihood activities.

Transition dynamics also need to be evaluated in view of upland food security concerns. The World Food Program's first country-wide food security study of 2006[35] concluded that chronic malnutrition in Lao PDR remains at an alarmingly high level in rural areas and has not decreased during the past decade. One out of every two children in rural areas is chronically malnourished, affecting not only their physical development but also their cognitive capacity. Thirteen percent of the rural households have either poor or borderline food consumption and two-thirds of the upland households have an asset portfolio that makes them vulnerable to shocks. The study also reveals that ethnic groups that comprise the majority of the upland population are the most disadvantaged and food insecure.

In conclusion, households practicing traditional farming systems are more likely to be negatively influenced by the push-factor framework while households engaging in fixed rotational cropping and intensified livestock production can be either winners or losers in the transition. Households that practice other emerging systems generally benefit in the transformation. Box 6 summarizes a similar transformation experience in Vietnam during a 1990s period of forest preservation and management. As in this example, whether short-term, improved income generation can lead to sustainable livelihoods in the long term is a question further discussed below.

C. Sustainability Aspects of Upland Livelihood Strategies

The coping strategies reflected in the typology of production systems can either lead to sustainable or unsustainable livelihoods in the long-term:

Sustainable livelihoods are characterized by a sustainable use of natural resources, environmental stability, and broad-based income increases for the rural population.

Unsustainable livelihoods are characterized by unsustainable use of natural resources, environmental degradation, widening economic and social differentiation of households, and the emergence of 'problem areas,' which will require continued support by the Government of Lao or donors, for example, in the form of future landscape rehabilitation programs.

Regarding the livelihood outcomes of the new agricultural production systems that are shaping the Northern Uplands, fixed rotational cropping (Group III); annual cash crops in monocultures (Group V), and intensified production of large livestock (VIII) as currently practiced are likely to lead to unsustainable development patterns.

[34] Results of an impact assessment of the Phong Saly Development Project on rural livelihood in the District, IRAM, 2006, provided by Agence de Développement de France.
[35] World Food Program, draft report.

However, several positive examples of sustainable livelihood development exist as well albeit on a very small scale. Agro-forestry models of Oudomxay, local community involvement in eco-tourism in Luang Namtha, and careful cash cropping in Bokeo show that in-country experience exists for the development of sustainable livelihoods and that farmers who are provided with a choice, combined with initial and extended financial input, are likely to adapt more sustainable livelihood strategies, with a development outcome in line with the sustainable livelihoods framework.

The development outcome of industrial plantations of perennial crops (Group VII) depends on scale—the larger the scale the more likely to have negative environmental impacts. As Groups III, V, and VI are the most widespread strategies emerging as a response to the current mix of policy push and market pull factors, the present livelihood development in Lao PDR does appear to be not sustainable in the long-term. Figure 8 gives a visualization of the two main development trajectories.

D. Environmental Outcomes of the Upland Transformation

The Northern Uplands of Lao PDR remains an ecologically, relatively intact region as compared to neighboring countries. However, throughout the Northern Uplands landscape-level trends have been observed that indicate the uplands ecosystems and natural landscapes are becoming less resilient and more vulnerable as a result of the transformation process.

Soil degradation through permanent annual cropping. Farming soil degradation is occurring in most maize-growing areas, as well as areas of fixed rotational cropping of upland rice, in the absence of sensible crop rotations using either nitrogen-fixing legumes or mineral fertilizers. As permanent cultivation on plain areas and lower slopes is expanding into higher and upper slope areas, soil degradation dynamics are likely to increase. Since most cash crops cannot be cultivated in steep limestone mountain areas, there are marked differences in the landscape between soil mountain (*phu*) and limestone mountain (*phu ba*) areas, with the latter being more densely forested. Market development (pull factor) and production costs will determine whether annual cropping areas are further expanding into forest areas or remain stable provided that the restrictions (push factor) continue to be only weakly enforced. Falling prices in accord with lower yields on declining soils will likely cause farmers to switch from annual to perennial crops (i.e., from maize to rubber, a trend that has already started in southern Xayabury). In those parts of the Northern Uplands where higher altitudes do not allow for the growing of rubber trees after the soil is depleted, livestock pastures and further degradation or future costly reforestation programs are the more likely scenarios. The application of conservation agriculture practices would help farmers to achieve a more balanced use of the upland soils, but so far such technologies are applied at very limited pilot scale.

Box 6. Transformation Experiences from Vietnam

Until the early 1990s, Vietnam pursued a program of socialist transformation, attempting a radical break with traditional forms of social organization and natural resources management in rural areas. In the 1960s the state nationalized forest land and established a system of state forest enterprises in northern Vietnam. Forest resources became state property. Local demands on forest resources turned into threats to forest preservation and management. Protecting the forest from encroachment by local people became the major goal of state forest authorities. State policy thus separated local people from the forest, as it has happened in other countries in Southeast Asia.

The transformation of rural resource management was far-reaching as well. The collectivization campaigns around 1960 implanted agricultural producer cooperatives into the villages of northern Vietnam. Local relations and institutions among people gave way to a centrally conceived scheme of rational land management. Cooperatives replaced communities, as state forests substituted for local forests. Village institutions regulating agricultural production and socio-cultural life were to disappear, just as local forest use had to cease. State forest management was only part of a larger attempt of transforming the use of rural resources and traditional social structures in the highlands. The transformation of social structures and resource use also included massive programs of resettlement and sedentarization. Between the late 1960s and early 1990s, the Vietnamese government resettled around five million people from lowland provinces into the uplands. The settlers were to expand Vietnam's cultivated area and exploit natural resources in upland areas, which were perceived as "under-utilized."

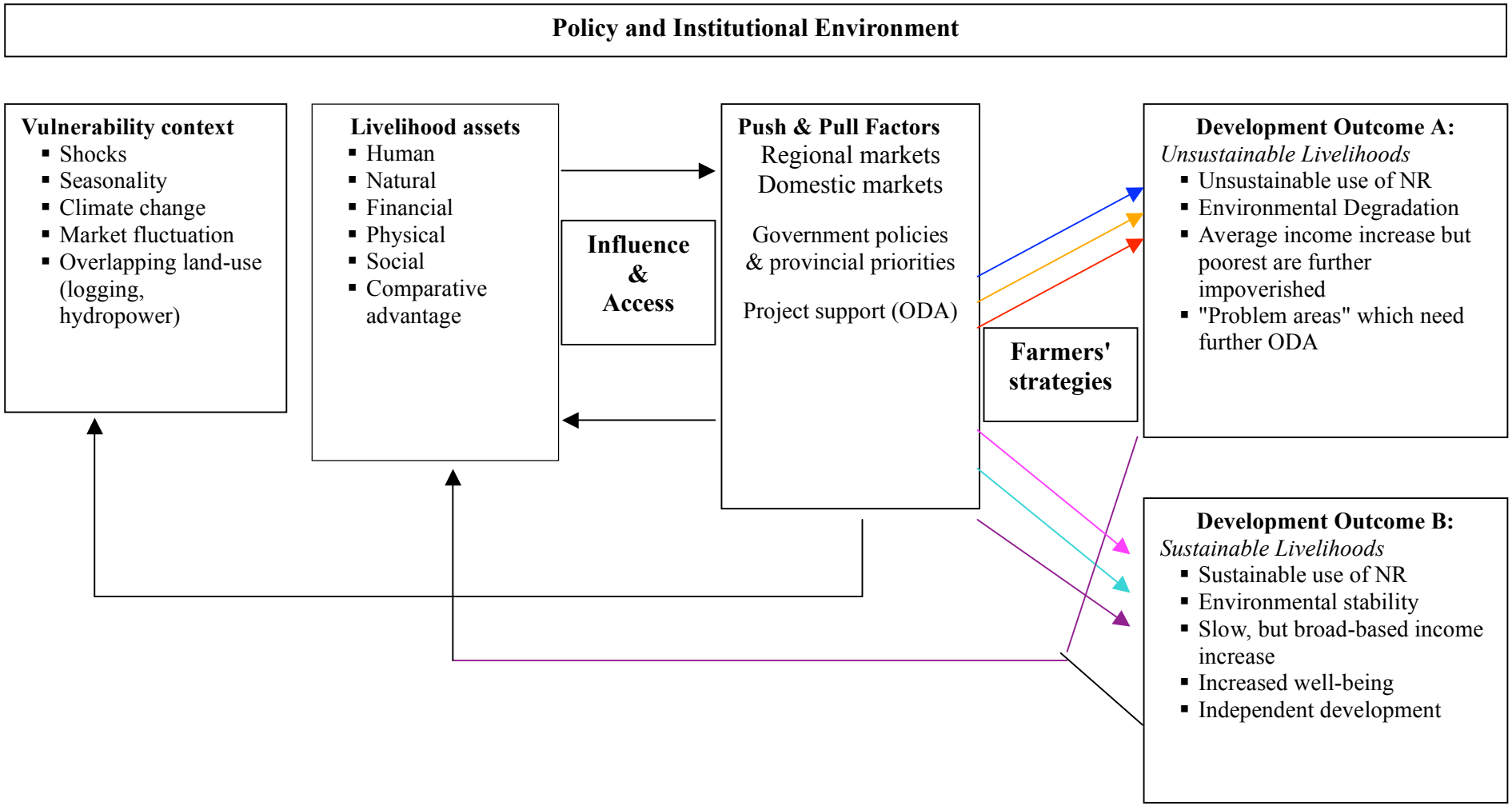
The Fixed Cultivation and Sedentarization Program had the objective of settling pioneering swiddeners by providing permanent settlements either in the same area or in more fertile, more accessible, non-catchment areas at lower altitudes. The program covered 1.9 million highland cultivators between its establishment in 1968 and 1990. In addition, the Government envisioned state forest and agricultural enterprises to play important roles in regional development in the highlands.

The transformative approach to managing rural resources brought about a drastic decline in Vietnam's forest resources. In 1991, the Government classified 10 out of 19 million hectares of designated forest land as 'barren' because it was not covered with trees. For the whole country, the annual loss of forest had been reported as 110,000 hectares in the late 1980s. Furthermore, major Government policies and programs, including the Doi Moi economic reforms drove agriculture transition in Vietnam's Northern Uplands. Starting in 1982, land use rights for previously collectivized paddy fields and plots of sloping lands were allocated to individual households to intensify agricultural production. In the given policy and market environment, farmers shifted from traditional to 'modern' production systems within less than a decade, causing widespread problems with massive erosion and land degradation (e.g., in the Northwestern Song Da watershed, which feeds Vietnam's largest hydropower plant, the Hoa Binh dam).

Beginning around 1993, forest land allocation and large-scale tree plantation programs were implemented in response to the deforestation trend and unsustainable land use patterns. Although reforestation efforts have been impressive, plantations have much lower biodiversity values than the natural forest they have replaced. In addition, farmers yet again had to develop new production systems to sustain or increase the income they could generate from shrinking agricultural land accessible, with fruit tree orchards, fish ponds, and intensified livestock production systems emerging. While a considerable part of the upland population has benefited in terms of income and sustainable livelihoods, ethnic communities in mountainous areas, in particular the Hmong, still rely on swidden agriculture and remain the poorest segment of the population in Northern Vietnam.

Source: T. Sikor and U. Apel, Discussion paper prepared with support of the Asia Forest Network, 1998.

Figure 8. Livelihoods Framework in Upland Areas of Northern Lao PDR



Land degradation through intensified production of large livestock. Numbers of ruminant livestock (buffalo, cattle, and goat) in the Northern Uplands were estimated at 758,800 head in 2004, down from 829,100 head in 1996 but up from 550,000 head in 2001. The estimated average annual increase between 1980 and 2000 was 0.75 percent for buffalo, 5 percent for cattle, and 8 percent for goats, representing a significant increase of livestock numbers, in particular for cattle and goats, in line with field impressions.[36]

Government and donor partners generally assess livestock as highly positive for poverty reduction and as an alternative to swidden agriculture. Negative impacts are considered insignificant and localized and are restricted to water contamination from confined pen areas and the nutrient depletion under cut-and-carry systems, both of which have mitigating measures to prevent any negative environmental impact. Other researchers (e.g., Phimphachanhvongsond and others 2004: 129-138), recognizing the problems of livestock intensification without appropriate technologies, are convinced however that livestock intensification is a pathway out of poverty. The overall outcome is that livestock production is heavily promoted across the Northern Uplands.

Field observations revealed a widespread but inaccurate view of PAFO and DAFO staff. They believe that ruminant grazing increases forest cover. This view probably stems from observations that grazing on fallow areas that are regenerating more slowly because of intensive swidden agriculture of the past can have an initial positive effect on the recruitment of trees by removing their grass and shrub competitors. However, the pioneering species that are usually occurring are fire- and drought-resistant species. Grazing will inhibit the further succession toward natural forest plant communities and will create an open landscape with sparse trees or—depending on the grazing intensity and natural conditions—grass- and shrublands. Grazing in natural forests, combined with the use of fire, is leading to a long-term change in its floristic composition toward drought- and fire-resistant species and to open forest and shrublands.

Serious landscape-level degradation through overgrazing is occurring in large parts of Xieng Khouang, Luang Prabang, and Houa Phan where the density of ruminant livestock is considerably higher than in other areas of the Northern Uplands. Uncontrolled free grazing and foraging with limited supervision is the common practice. Additional fodder production is limited and only practiced on piloted scales. A new trend is that farmers deliberately use forest fire to induce fresh grass growth every year. This will ultimately lead to fire successions and open grazing landscapes with *Imperata* and shrub associations, including sparse trees of species that are

[36] Participatory Livestock Development Project (PLDP), Asia Development Bank, 2006--The first comprehensive agricultural census was conducted in 1998/99. Before that time, only estimates were collected by District and Provincial Agriculture and Forestry Offices, which often had to meet specified targets. It is likely that these figures were inflated. Conversely, data collected in the agricultural census may underestimate actual numbers as farmers may have under-reported livestock numbers for a variety of reasons, such as fear of taxation.

adapted to regular fire (*Pinus spp., Schima wallichii*). After the fire disturbance regime becomes established, the new system becomes dependent on this regime and increasingly difficult to rehabilitate (e.g., through afforestation).

Overgrazing is by no means limited to grazing systems and is also likely to become a problem under mixed farming systems (Box 7). Grazing lands in the Northern Uplands are located in comparably dryer areas and often nutritionally marginal by nature. Here, overgrazing removes protective vegetation and compacts soils making them vulnerable to water and wind erosion, which further depletes the nutritionally richer upper layers. Over long periods of time, selective grazing of the more palatable plants in combination with the deliberate use or accidental occurrence of fire, the landscape completely changes in terms of vegetative composition and cover. The best example in Northern Lao is the pine savannah forests on the Plain of Jars, an outcome of overgrazing.

Box 7. Overgrazing – A Global Perspective

In a global perspective, inappropriate grazing—or overgrazing—is the major cause of land degradation and desertification. This is well-known and well-documented for arid and semi-arid grazing systems. But this process also occurs in humid and sub-humid grazing systems as well as in temperate and tropical highland systems. The introduction of domestic livestock can have a dramatic effect on ecosystems.

- In North America, the grasslands that once dominated the central areas have been greatly reduced through overgrazing, agricultural development, and fire suppression. These grasslands are the primary agricultural land in North America. Only about 1 percent of the original prairie ecosystem is still intact (Barbour and Christensen 1993).
- In the Middle East, overgrazing by goats, sheep, cattle, and camels is one of the principal causes of desertification in the region.
- In Central and Northern Asia, over-grazing is a serious threat in semiarid regions, where most of the pasture has been degraded and lost to erosion.
- In South America, huge areas of the cerrado have been devastated in the last decade by cattle ranching and mechanized agriculture. In 1990, an estimated 56 percent of the original two million square-kilometers was in managed use and 37 percent under cultivation (Dias 1990: 583-640).
- In Africa, large herds of cattle and goats are maintained, and their grazing has a major impact in many areas of woodland, wooded grassland, shrubland, and grassland. Restrictions of movement of animals, along with increases in numbers, have led to severe environmental degradation in some areas. Successful tsetse fly eradication campaigns, such as in the Zambezi Valley, have led to uncontrolled settlement and introduction of domestic cattle, causing the rapid degradation of previously almost untouched vegetation.
- On small islands, overgrazing can be a major threat to the survival of native ecosystems. For example, overgrazing is the second most important threat in some parts of Gran Canaria on the Canary Islands, and particularly on the island of Fuerteventura, where original forest landscape has been reduced to desert over the centuries.

The global livestock sector generates more greenhouse gas emissions measured in carbon dioxide (CO_2) equivalent than transport. When emissions from land use and land use change are included, the livestock sector accounts for 9 percent of CO_2 deriving from human-related activities, but produces a much larger share of even more harmful greenhouse gases. It generates 65 percent of human-related nitrous oxide, which has 296 times the global warming potential (GWP) of CO_2. Most of this comes from manure. It also accounts for 37 percent of all human-induced methane emissions, which is largely produced by the digestive system of ruminants, and 64 percent of ammonia, which contributes significantly to acid rain (FAO 2006).

Transformation of natural forests into industrial tree plantations. The reduction of natural forest areas and their replacement with industrial plantations, agricultural cash crops, and pastures, as well as forest degradation through logging is accelerating in large parts of the Northern Uplands. Significant landscape-level changes are likely to be seen in the decades to come. Compared to neighboring countries, the scale of transformation is smaller, but locally it is significant. Most of the existing forest in the Northern Uplands is composed of natural forest plant communities. The percentage of plantations and thus of non-natural forest will increase in the future. The Forest Strategy 2020 set the target of 500,000 hectares of plantations until 2020 for which only a few species, such as rubber, teak, Aquilaria, eucalyptus, and probably Pinus, will probably be used.

Landscape transformation through other macro-scale land use priorities. Besides smallholder activities, other macro-scale development priorities have environmental impact at landscape level. Among these, most notably hydropower development is high on the agenda of the Government of Lao PDR. By 2020, Lao PDR envisages energy generation with an installed capacity of 30,000 megawatts. The figure includes 8,675 megawatts to be generated by 29 major hydropower projects being built or proposed along the Mekong River and its tributaries.[37] The schemes in the Northern Uplands will lead to the inundation of valuable arable and fertile land on which intensive and permanent agricultural production would be possible.

E. Synthesis on Policy Outcomes and Policy Gaps

The Government's upland and agriculture policy goals are being increasingly achieved but implementation practices have led to a number of significant unintended and often negative outcomes, which are not well recognized or yet addressed. Table 7 summarizes policy implementation weaknesses and gaps. As discussed, these outcomes extend over economic (e.g., livelihood insecurity, high-risk production strategies); environmental (e.g., increasingly unsustainable land use); and socio-cultural and institutional issues (e.g., loss of traditional institutions and governance mechanisms). Some of the outcomes, such as those resulting from intensive maize mono-cropping, are affecting the individual farm level; some occur at the watershed level, such as industrial tree plantation development, and some have even landscape-level implications, such as the intensified production of ruminant livestock.

The current policy framework represented by the 4 Goals and 13 Measures is promoting agriculture commercialization and market integration while its broader upland and rural development-related elements have primarily restricting effects on upland communities and their livelihood strategies. The success of promoting commercial agriculture primarily depends on the strength of the market pull factor, which is a function of access to market infrastructure. The stronger this market pull, the less restrictive is the policy push-factor framework—reflecting an inherent

[37] Vientiane Times, January 12, 2008.

contradiction in the policies in that remote upland farmers face more restrictions with regard to their livelihood opportunities and transition options while only those farmer households with market access tend to benefit from the policies.

Equally important, the upland and rural development policies are in striking contrast with the NGPES-formulated goals of poverty-reduction and pro-poor growth. A key conclusion is that the current policy framework in its implementation is not sufficiently sensitive to those of the Lao society who live in remote areas with limited market access and few alternatives for ensuring food security and generating income other than traditional swidden agriculture.

Table 7. Policy Implementation Weaknesses and Policy Gaps

MAF Policy Goals & related programs	*Policy implementation weaknesses*	*Emerging policy gaps*
Goal 1. Food production; Food security	▪ Based on lowland perceptions and 'green revolution models' ▪ Narrow technical focus (soil suitability, crop varieties, yields) ▪ Weak extension services ▪ No pro-poor implementation mechanisms in place ▪ Poor design and maintenance of irrigation schemes	▪ Contradiction with Goal 3 ▪ Contribution of swidden agriculture to food security in poverty districts neglected ▪ Contradiction to restriction in land access for upland rice production ▪ Cash crop promotion not leading to food security
Goal 2. Commodity production; Commercialization	▪ Negligence of promotion of smallholder agriculture and reliance on concessions ▪ No policy framework in place to facilitate/balance market ▪ Lacking market information systems ▪ Little attention to quality control ▪ Organic agriculture not sufficiently promoted	▪ Not feasible in areas with weak infrastructure ▪ Leads to monocultures (not to the desired diversification) ▪ Leads to lower forest cover and fragmentation of natural forest ▪ Risk management (market fluctuations, market failures) ▪ Potential of NTFP overestimated
Goal 3. Stabilization of shifting cultivation; Land and forest allocation; Permanent occupation (Village Cluster Development)	▪ Too rapid and poorly tailored to needs of ethnic communities in upland areas ▪ Implemented with poor participation at village level ▪ Differing priorities in provinces leading to different outcomes ▪ Little regard for socio-cultural implications ▪ No pro-poor sensitivity ▪ Little flexibility for alternative livelihood strategies	▪ Unintended side effects such as weakening of social institutions at grassroots level ▪ Promotion of single technical solutions (e.g., livestock) leading to less sustainable land use and environmental degradation ▪ Scarce income-generating alternatives in remote areas ▪ Period of higher land tenure insecurity by replacing customary with statutory rights
Goal 4. Sustainable forest management; Watershed management	▪ Continued operation of timber quota system ▪ Illegal logging not adequately addressed ▪ Focus on plantation forestry vs. natural forest management	▪ Need for improved community-based forest management ▪ Contradiction with other development priorities (e.g., mining and hydropower) ▪ Higher forest cover goals but lower diversity and ecosystem integrity accepted

VI. Livelihood Development: Policy and Support Options

This final chapter discusses options for supporting a successful transitional framework in the Northern Uplands in four key areas:

- Fostering integrated rural development approaches,
- Enhancing the policy framework,
- Defining the role of government in the transition, and
- Managing environmental outcomes.

A. Integrated Rural Development Approaches

How to provide livelihood support to disadvantaged communities in marginal areas.

There is a strong rationale for Government intervention in the Uplands to provide disadvantaged communities in poor and marginal environments with support in the form of demand-driven integrated rural development approaches. The Uplands are becoming increasingly heterogeneous and economically dissimilar in the transition, with some areas advancing and others being left behind. Because of the current inequalities in households' assets, policy and market-based reforms alone cannot quickly level the playing field between the asset poor and those who possess the complementary assets necessary to exploit economic opportunity. Some growth-oriented investments can bypass poor households and deepen inequalities if more targeted interventions to build the asset bases of the poor are lacking.

While investments in such single assets as road infrastructure or rural electrification remain critically important for regional integration and commercialization, these investments need to be complemented by geographically targeted and integrated support for rural livelihood development in marginal areas. Investments would help build and improve household assets and enable upland communities to better participate in overall upland development. Such support would include investments in small-scale, community-based rural infrastructure; agricultural technologies that are adapted to livelihood needs but also to changing production and market conditions; health and sanitation; and education. With regard to the emerging production systems, tailored support in new production technologies for fixed rotational cropping, upland and intensified rice cultivation, cash cropping, and livestock raising need to be provided. This support could come, for example, through investments in agriculture extension to promote the adoption of sustainable production and grazing practices; improvements in the delivery of livestock services, market support services (price information, grading, post-harvest management, etc.), and also through institutional development such as promoting farmer groups and marketing associations. The appropriate roles of the public and private sectors in providing access to assets should be carefully considered.

B. Policy Framework

How to make the upland and agriculture policy framework pro-poor sensitive and ensure broad-based agriculture growth and sustainability in the Northern Uplands.

With regard to traditional farming practices, upland environmental degradation, and upland poverty, a careful and open policy assessment of whether these underlying assumptions are adequate and relevant would be an important step toward making the upland and agriculture policy framework less restrictive for upland livelihoods and more pro-poor sensitive. A useful assessment should build on evidence and local experiences with traditional land use practices and their livelihood and food security benefits, socio-cultural and ethnic conditions, and ecological appropriateness in the upland environment of Lao PDR.

A revised upland and agriculture policy framework would distinguish between the different levels of intervention. On the one hand, policy interventions could be tailored to location-specific characteristics; for example, in places where market opportunities are not available, upland communities should not be subjected to the same extent of land use restrictions as those who have opportunities for alternative income generation outside traditional agricultural practices. This would require a more careful and flexible sequencing of policy implementation, especially in the case of the LFAP and the Stabilization of Shifting Cultivation Policy. On the other hand, policies could be formulated in ways that distinguish between individual production systems, market access conditions, and remoteness level of upland communities as well as market participants. Policies should not only focus on smallholder producers but also include private commercial investors if overall poverty reduction and rural development objectives are to be achieved.

While there is certainly a need for more effective participatory extension approaches and improved technologies, technical issues are presently given too much attention for direct government intervention (e.g., analysis of land suitability, soil fertility, seed varieties, crop selection, irrigation structures, etc.) while at the same time the creation of an enabling environment for livelihood security is not given the needed attention. Although technology investments could lead to improved productivity and diversification into higher-return activities for some, support for agriculture production alone is not sufficient for sustainable poverty reduction in upland areas.

Finally, there is a need for applied and problem-oriented policy research within the Government and other organizations in Lao PDR. In view of the above, building Government policy research and evaluation capacity—beyond measuring output targets—is probably one of the most immediate priorities.

C. Role of Government in the Transition

How to provide public services more effectively and facilitate private sector investments in support of sustainable upland development.

Defining the 4 Goals and 13 Measures and the individual programs and activities that

are to be implemented (and need funding) at central, provincial, and district levels could help to develop a better sense of the public and private sector elements in this framework, for example, with regard to public infrastructure investments in relation to the Government's regulatory and facilitator roles. It also includes the need for understanding the overall fiscal implications with regard to investments and recurrent costs and operational budgets under 4 Goals and 13 Measures.

The role of government in the upland agricultural development process is likely to become increasingly more important in light of the more complex nature of the market. Prior to the 6th and 7th Party Congresses, agricultural development focused on national and local food security and meeting the immediate needs of the Lao people. The market was clearly identified as a domestic market and the needs of that market were determined to be staple foods in the Lao diet: rice, meat, and vegetables. Subsequent to adoption of market-oriented policies, followed by globalization, trade liberalization, and economic modernization, producers began to respond to market signals from different sources, mostly outside of Lao, but still nearby. It is in this context that the Government is obligated to redefine its role: from one of being a central planner and macro and micro supervisor, to one of being a facilitator, monitor, and guide.

A clearer picture and definition of the Government's own program is a prerequisite for potential programmatic funding support from the State budget, through domestic sources and the donor community. With clearer operational definition of the 4 Goals and 13 Measures, Government's key responsibility to support implementation of the programs with appropriate expenditure policies becomes more focused.

Investments in infrastructure are likely to emerge as key priorities for Government intervention. Improved road access would have a positive impact on market participation and poverty reduction. It has been demonstrated that the magnitude of the pull factor in the Uplands is mainly a function of road and river infrastructure. Roads and other market-related infrastructure have direct and indirect influence on household economic decisions and livelihood strategies. It is imperative that these investment priorities are reflected in the 4 Goals and 13 Measures and fiscal implications are assessed. Other support options, in relation to market infrastructure, would include market information systems, training in entrepreneurship, micro-credits, education, among others.

The provision of secure land tenure and land titling is an upcoming issue in Lao PDR. The increasing awareness of land scarcity is only now emerging in the transition from a predominantly subsistence economy to a market economy, where a market-oriented tenure system based on property rights is desired and necessary. Similarly, promoting an enabling environment for farmer-to-business arrangements is needed. Study of various contract farming arrangements should be undertaken for the purpose of identifying the scheme that provides maximum benefits to the producers while not dissuading the investors. Although an assortment of arrangements could be acceptable, each should describe the situation for which it is most suitable and most inclusive. Inexperienced and largely illiterate farmers (particularly women and ethnic minority

groups) should be provided with detailed explanations of the terms and conditions of the arrangements, a critical point as "agrarian policy in Lao moves vulnerable rural people toward a fuller integration."

D. Environmental Outcomes

How to manage environmental outcomes and mitigate negative impacts of the transition.

Managing the environmental outcomes of the transition process requires Government attention. Four areas stand out: impact of intensified livestock development, cash crop monocultures, large-scale rubber plantation development, and community-based resource management. These can be addressed in the context of integrated watershed management. Specifically, the long-term sustainable potential for livestock development in the Uplands should be carefully assessed. This is especially important in determining whether there is additional potential for livestock in mixed farming systems that produce forage in sufficient quantities or whether livestock serves as mainly a security system and one of the dominant coping strategies of farmers facing the shifting cultivation ban. In case of a livestock-based security system,negative outcomes result from overgrazing by ruminant livestock. Short-term technical solutions—pasture management, cut-and-carry systems, forage production, vaccination, and stall feeding—need to be adapted by farmers into their traditional livestock management systems. This would require a participatory research and extension approach with committed and informed follow-up and responsiveness to farmers needs. In relation to cash-crop monocultures, avoiding negative long-term impacts on the environment and local economy would require improving enforcement of existing restrictions and regulations (direct seeding, mulch-based conservation agriculture; tractor plowing; forest protection; among others) and promoting direct seeding, mulch-based conservation agriculture and diversification through large-scale program support.

Avoiding the negative environmental impacts of large-scale rubber plantations would require introducing ceilings and fiscal policy that would set incentives for a more environmentally sound cultivation of rubber (e.g., protection of ecological valuable streams, rivers, and creeks). Lack of macro land use planning and regulations has been a major problem for an environmentally sound establishment of rubber plantations. Clear regulations should be formulated and enforced. Initial efforts have been made in Luang Namtha, Oudomxay, and Luang Prabang toward this measure; initiatives self-started by each of the provinces. Community management of natural forests, especially the sustainable production of valuable timber, has a good potential for development of the Northern Uplands in an environmentally more sound way. Information gaps for managing environmental outcomes of the transition include rates, locations, and types of deforestation, and land degradation; and monitoring and evaluation of the environmental impacts of policies.

ANNEX A. PRODUCTION CHANGE FOR MAJOR CROPS AND CATTLE IN NORTHERN UPLANDS, 1995 AND 2005

Province	*1,000 hectares*										*1,000 head*	
	Wet season rice		*Upland rice*		*Maize*			*Soybean*		*Rubber (targets)*	*Cattle*	
	1995	*2005*	*1995*	*2005*	*1995*	*2005*	*2007*	*1995*	*2005*	*2007*	*1995*	*2005*
Phong Saly	5.5	9.0	20.7	5.5	2.0	2.1	4.3	1.3	0.3	8.0	17.3	20
Luang Namtha	5.8	12.7	13.4	6.7	0.45	1.7	1.9	0.1	0.0	13.0 (20.0)	21.2	24
Oudomxay	7.5	11.7	26.0	15.3	4.39	15.7	21 (2007)	0.4	0.3	9.0 (30.0)	41.6	29
Bokeo	7.1	12.8	7.2	3.9	0.67	6.4	13 (2007)	0.1	0.3	0.7 (15.0)	27.8	26
Luang Prabang	8.4	13.8	37.2	2.6	4.98	8.8	12.5	0.3	4.1	4.0 (30.0)	34.1	39
Houa Phan	8.1	11.5	15.3	13.6	3.01	4.0	6.5	1.0	2.4	?	30.0	47
Xayabury	18.0	25.0	14.0	15.0	2.35	20.1	29.6	0.3	0.2	0.06 (50.0)	57.6	65
Xieng Khouang	11.9	16.8	8.3	7.0	4.84	6.9	11.0 (2007)	0.2	0.5		74.9	89
Northern Uplands	**72.3**	**113.3**	**142.1**	**69.6**	**22.7**	**65.7**	99.8 (2006/7)	**3.7**	**8.1**		304.5	339
Lao PDR	**367.3**	**569.8**	**179**	**105.2**	**28.3**	**86.0**	113.8	**5.8**	**9.5**		1,145.9	1,272

Sources: *Agriculture Statistics Yearbook 1975-2005; and Yearly Statistical Report, 1975-2005* (Ministry of Agriculture and Forestry, Department of Planning); and consultations with provincial authorities.

ANNEX B. SWIDDEN AGRICULTURE SYSTEMS – MISCONCEPTIONS AND EMPIRICAL EVIDENCE

Traditional forest-based swidden agriculture is the focus of intense debate in the context of upland agriculture and agro-forestry development.[38] Swidden agriculture on forested land is generally characterized as destructive and wasteful and seen as a major cause for deforestation leading to soil erosion and ultimately to environmental degradation. It is also often stated that increasing population pressure leads to more frequent cultivation cycles and shorter fallow periods resulting in lower soil fertility and yields and barren land or marginal grassland successions and ultimately in the collapse of the production system.

Sustainability and diversity. Swidden agriculture systems can represent highly sophisticated and productive uses of forest land and might indeed be the only sustainable form of agriculture yet devised for tropical rainforest habitats (Kleinman and others 1995). Comparisons between rice yields in lowlands and swidden fields are misleading, as they do not take into account the many other crops associated with swidden upland rice cultivation (Ducourtieux 2004: 71-94). Swidden agriculture is typically part of a broader portfolio that also includes collection of non-timber forest products, hunting, agro-forestry, home gardening, and wage labor (Dove and Rhee 2004). And it produces relatively high returns per unit of labor (Conklin 1957), which gives farmers time to engage in a number of livelihood activities simultaneously.

In a long-term case study in three villages in northern Lao PDR, Seidenberg and others (2003) report a deforestation rate of only 1 percent over 10 years (1989-1999) where the deforestation rate reflects shorter fallow periods in swidden systems of secondary forests rather than encroachment on mature forest. In comparison, the annual deforestation rate for all of Lao is estimated to be 0.45 percent. Fox and others (2000) suggest that deforestation, referring to a permanent change in land cover from forest to non-forest, is not taking place to the extent previously suggested in swidden agriculture areas in the northern mountain regions of Vietnam. Supporting this view, Leisz and others (undated) in a case study in the Ca River Basin in Northern Vietnam, suggest that remote sensing and digital image processing with broad classifications fail to capture the differences between the agricultural system and the forest, especially for land cover classes associated with the exploitation of the forest, degraded forest, bamboo, shrub, grass, and farmland. Mertz (2002) reviewed 330 studies regarding the widely accepted correlation between shortened fallow periods and yield decline. His results question whether a correlation exists and concludes that gloomy "collapse" scenarios are not justified. Kuniyasu (2002) supports this result in a case study from the Jinuo mountains in Xishuangbanna where swidden farming systems still work with much shorter fallow periods.

In conclusion, the majority of scientific research on swidden agriculture systems over the past 50 years points to its relatively high environmental sustainability and resilience, importance for food security, high returns to labor, and species enrichment and biodiversity conservation.

Community-based access to resources. Swidden agriculture is usually perceived in the context of open access to forest resources without clear rights to the resource or control mechanisms. Indigenous people—to whom traditional swidden agriculturalist

[38] See for example Dove 1983, Dove and Rhee 2004, Fox and others 2000, Hayes 1997, Laungaramsri 2005, Mertz 2002, Saenmi and Tillmann 2006.

usually belong—do view land not as a commodity but often as an endowment with sacred meanings, embedded in social relations and fundamental to the definition of a peoples' existence and identity (Davis 1993). The customary practice of swidden agriculture is based on what could be termed 'community property rights,' which are usually differentiated along individual, gender, family, lineage, and community lines (Laungaramsri 2005).

Swidden fields are typically worked by individual households and/or by reciprocal work groups, and its yields are owned and consumed privately and individually by each household (Dove 1993). In the customary system, household rights to swidden fields as well as to fallow land are circumscribed by community rules and opinions. Several regulations ensure equity among households and attest to the complexity and flexibility of ownership versus usufruct rights (e.g., an individual household of one lineage that is in need of land may request another lineage in charge to allow use of the land). For centuries community institutions have developed specific rules that govern access to land. Functioning institutions are thus especially important within the formal process of land zoning and allocation by shaping equitable household land holdings, regulating access to land, renegotiating plot boundaries, mediating in land disputes, and making decisions on benefit redistribution.

Subsistence versus market participation. Swidden agriculturalists are generally perceived to be subsistence based on upland rice and cut-off from markets and commercialization. However, swidden agriculturalists, in addition to planting subsistence food crops, typically also plant or collect market-oriented cash crops and, as a result, are often connected to the market economy. Historically, the best example is opium, which has been an important crop in swidden systems for the last 150 years. With its favorable bulk-value and easy storage, opium was an ideal cash crop in remote areas such as the Northern Uplands (Epprecht 2000). Foppes and Ketphanh (2004: 181-93) report significant annual household cash incomes from selling non-timber forest products ranging from US$69-127, averaging 45 percent of household cash incomes. In a case study on swidden farmers in Samlang, Ducourtieux (2004: 71-94) reports a solid economic performance with average family incomes over 15.6 million Lao Kip (US$1,490) per year, including the market value of self-consumed produce. Monetary income is about 13 percent and does not primarily stem from swidden agriculture, but from collecting non-timber forest products, hunting, and fishing.

ANNEX C. CONTRACT FARMING ARRANGEMENTS IN THE NORTHERN UPLANDS

Name	*Nationality*	*Activity*	*Area (ha)*	*Years*	*Total investment (US$)*
Oudomxay Province					
Siphan Salika Rubber Development	Lao	Rubber plantation, provide rubber seedlings to local producers	10,000	15	1,000,000
New Over Technology Natural Resource Import-Export Co., Ltd.	Lao	Promote Eucalyptus plantations, gather NTFPs from local people, semi-processed wood for export		40	2,000,000
Maize Dryer Factory	Lao	Promote maize raising, gather and dry for export			1,476,600
Davone Agriculture Development Import-Export	Lao	Provide crop seed, gather NTFPs & agricultural products from farmers		15	350,000
Somechanh-Chanpheng Rubber	Lao	Rubber planting, provide rubber seedling			100,000
Jianfong Rubber Development Co., Ltd.	Chinese	Rubber plantation, rubber processing for export	6,700 M. Houn 6,000 M. Beng	15	4,500,000
Oudomxay Jinling Botanical Medicine	Chinese	Orchid planting for export		15	990,000
Chernyian Laos-China Co., Ltd.	Chinese	Castor-oil planting and gathering for export		15	500,000
Laos-China Jiantaly Rubber Development	Chinese	Establish rubber research plots, provide rubber seedlings, and gather latex for processing and export	2,000	40	2,000,000
Sino-Lao Rubber Co., Ltd.	Chinese	Establish rubber research plots, provide rubber seedlings, and gather latex for processing and export	5,000	30	1,000,000
Moxie Co., Ltd.	Chinese	Promote maize growing, gather for processing and export		30	2,480,000
Laos-China Yingjingpa Rubber Co., Ltd.	Chinese	Establish rubber research plots, provide rubber seedlings, and gather latex for processing and export	2,500	30	3,000,000
Laos-China Herngsin Development Co., Ltd.	Chinese	Promote maize growing, gather for processing and export		15	3,000,000
Chongxay Rubber Co., Ltd.	Chinese	Establish rubber research plots, provide rubber seedlings, and gather latex for processing and export	2,000	30	3,000,000
Ha Oudom Import-Export	Viet Nam	Mushroom raising for export, import agricultural machinery		15	200,000

Name	*Nationality*	*Activity*	*Area (ha)*	*Years*	*Total investment (US$)*
Co., Ltd.					
Fouthor Agriculture Development Co., Ltd.	Viet Nam	Import crop seed, agricultural machinery, gather agriculture products and NTFPs for export		10	295,000
Kuangwing Agriculture Development Import-Export Co., Ltd.	Viet Nam	Provide crop seedlings, gather agriculture products and NTFPs for export		15	300,000
Pakbeng Tea	Malaysia	Promote tea growing, gather tea leaves for processing and export.		15	700,000
Natural Products International	America	Promote organic soybeans and corn; operate a corn-drying facility		5	
Lao Farmers' Products	Lao	Promote farmers with rice, tea, and pineapple; and purchase those productions for full processing, purchase *mark nord* & tamarind			
Lao Food State Enterprise	Lao	Purchase NTFPs from farmers (Mulberry bark, *peuak meuak*, and bloom grass)			
Mr. Khamlar (exporter)	Lao	Purchase NTFPs from farmers (Mulberry bark, *peuak meuak*, *mark kha*, and bloom grass)			
Pasong Trading	Lao	Purchase *peuak meuak*, bamboo shoot, and bloom grass			
Mr. Arthang (exporter)	Lao	Purchase *peuak meuak* and bamboo shoot for export			
Kuangving Company	Lao	Purchase cardamom, *peuak meuak*, bamboo shoots, *mak kha,* and broom grass			
Fou Thor Company	China	Purchase cardamom, *peuak meuak*, bamboo shoots, *mak kha,* and broom grass			
Banlouphon Company	Lao	Purchase cardamom, *peuak meuak*, bamboo shoots, *mak kha*, & broom grass			
Luang Namtha Province					
Friend of the Upland Farmer	USA	Promote corn and soybeans for trading and for milling into livestock feed, promotion and processing of NTFPs and cardamom, integrated fish and poultry raising			
Zenhua Rubber	China	Rubber for export to China	500 ha (est.)	6,000 tons	
Flour Lao China	China	Grow cassava	214 ha	No contracts	

Name	*Nationality*	*Activity*	*Area (ha)*	*Years*	*Total investment (US$)*
Natural Rubber of Yunnan	China	Produce rubber	1,500 ha total		
Individual Chinese investors (with Lao partners)	China	Grow watermelon, pumpkins, bananas, and sugar cane	230 ha		
Mr. Mae Sa	China	Produce rubber			
Sino-Lao Rubber Co., Ltd.	China-Lao	Produce rubber	5,500 ha		
Seunly Company from Mengla, China	China	Produce rubber	2,000		
Xieng Khoung Province					
Lao Sericulture Company	Lao	Promote mulberry leaf production, promote weaving, purchase silk thread from villagers for textile production			
Sengpheth Winery	Lao	Purchase fruit from farmers, process fruit for wine and conserves and jams			
Bokeo Province					
Natural Products International Company	USA	Promote corn and organic soybeans for trading and for milling into livestock feed			
Houa Phan Province					
Superbee Network	Singapore	Beekeeping & honey production (withdrawn in 2005)			
Agroforex	France	Benzoin			
Outhaithany		Grow and process red tea at Jatropha plantation; establish a provincial organic products association for Jatropha and red tea farmers, export tea to France			

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