

# Impact of Urban Development and Market Access on Farming Systems Evolution in Xieng Khouang Province, Lao PDR

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## Abstract

In mountainous areas of Southeast Asia, lowland paddy rice is often assumed to be the cornerstone of farming systems. Households production strategies are usually analysed by assessing access to two factors: lowland paddy and the rice self-sufficiency level of the household. Rainfed rice, pig raising and off-farm activities are associated with households that are deficient in paddy rice, whereas cash crops and the raising of large ruminants are described as a diversification process run by families who have already met their paddy rice needs (Castella *et al*, 2002).

A survey of 73 households conducted in three districts of Xieng Khouang province revealed that traditional agriculture is being slightly modified by the emergence of new economic opportunities such as (i) increasing local and regional urban consumption demand, and (ii) better road access to markets. The survey divided households into ten different types according to their food security strategies. For paddy rice and marketable products, the labour and surface area allocated and the generated income by each type of product were all analysed. The labour and surface area allocated for both rice and market products, and the income generated by each product, are all assessed. When interpreting the difference in household response to markets, the local agro-ecological situation appears to be just as important as the level of rice self-sufficiency.

In the highlands, lowland paddy rice remains the prevailing cropping system but livestock activities produce 80-90% of the generated income. In the warm valleys, lowland paddy rice also prevails but cash crops are becoming increasingly significant in terms of both generated income and dedicated labour force. More diverse cropping systems are present in the uplands and sloping areas, but in all cases the importance of the rice crop in achieving household food security is decreasing.

**Keywords:** mountainous farming systems, market impact, household typology, Xieng Khouang, Lao PDR.

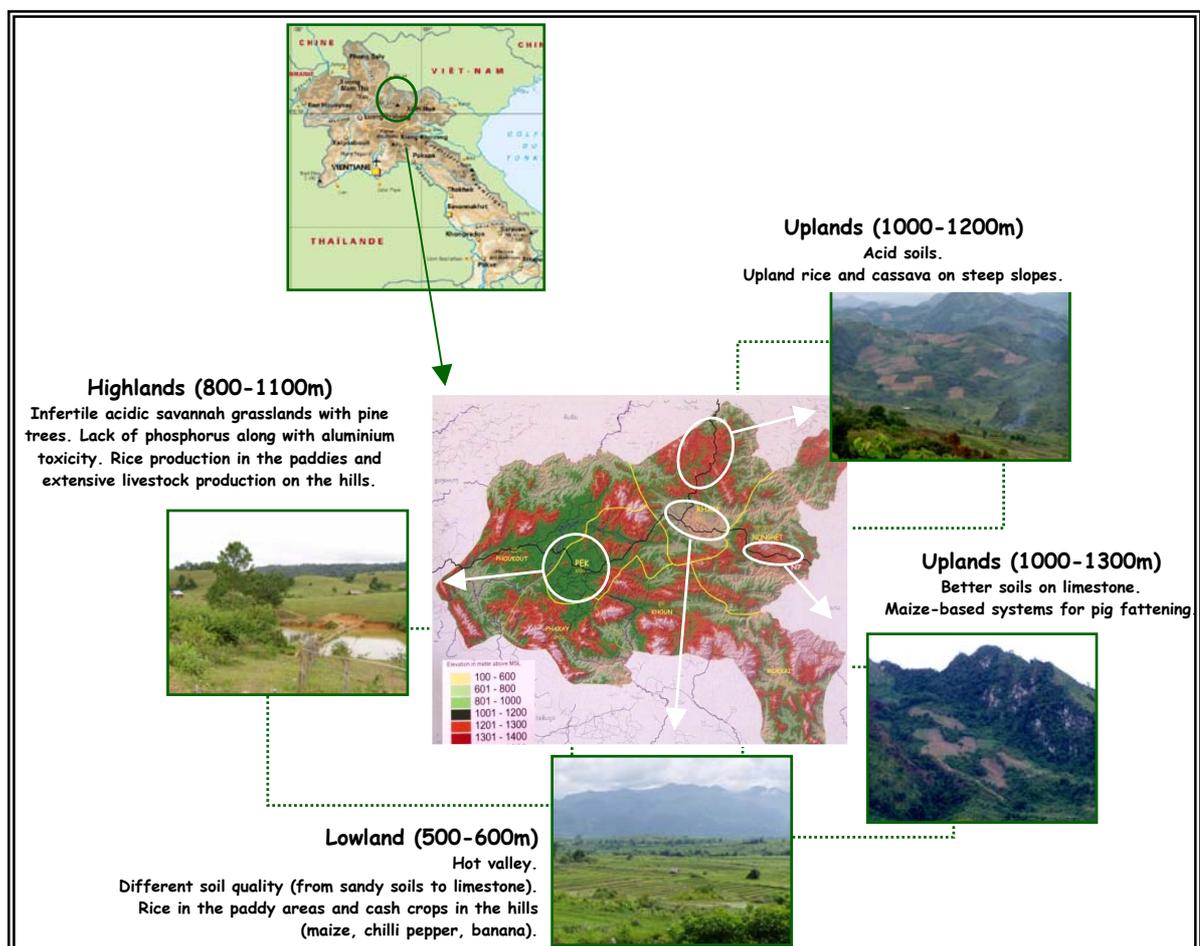
## Introduction: Rice Crop, the Cornerstone of Farming Systems?

In mountainous areas of Southeast Asia, rice crop is often presented as the cornerstone of farming systems. Chazée (1998) estimated that in 1995, more than 90% of households living in rural areas of the Lao PDR used rice-based farming systems. According to Chazée, 50% of these households produced rice in slash-and-burn systems, 30% grew rice in permanent agriculture systems in the flatlands, and 15% of households used mixed systems (i.e. both in the uplands and the lowlands). Estimates in 2000 indicated that 39% of the Lao population still depended on shifting cultivation (JICA, 2001, in Thomas, 2005) and according to Roder (2001), rice is the major upland crop, with maize, cassava and peanuts following far behind.

Castella et al (2002) analysed household production strategies in northern Vietnam according to two main factors: access to lowlands and rice self-sufficiency level. Rainfed rice, pig raising and off-farm activities are associated with households that are deficient in paddy rice, whereas cash crops and the raising of large ruminants are described as a diversification process run by families who have already met their paddy rice needs.

A survey of 73 households conducted in three districts of Xieng Khouang Province, Lao PDR (see figure 1), revealed that rice importance still prevails in remote areas with limited access. Farming systems in such areas are still based on food security and self-sufficiency, and rice crops remain the cornerstone of household production strategies. However, the emergence of new economic opportunities such as (i) better road access to markets and, (ii) increasing local and regional urban consumption, have also slightly modified these traditional schemes and encouraged the emergence of non-rice based farming systems in the province.

Figure 1: Xieng Khouang Agro-Ecological Areas



## New Economic Opportunities

### New Infrastructure

The UNDCP-IFAD Xieng Khouang Agriculture and Development Programme has been supporting a policy to improve the provincial roads and tracks network since 1991 (Bountong & Boualy, 2002). The tarring of two main communication axes (national roads 7 and 6) was completed in 2002 and these roads are maintained annually, allowing easy transportation of goods and people from Xieng Khouang to the national capital Vientiane, to northern provinces such as Houaphanh, and to Vietnam. Some old tracks have been enlarged, some new ones created, and funds have been scheduled from international and provincial sources for their maintenance.

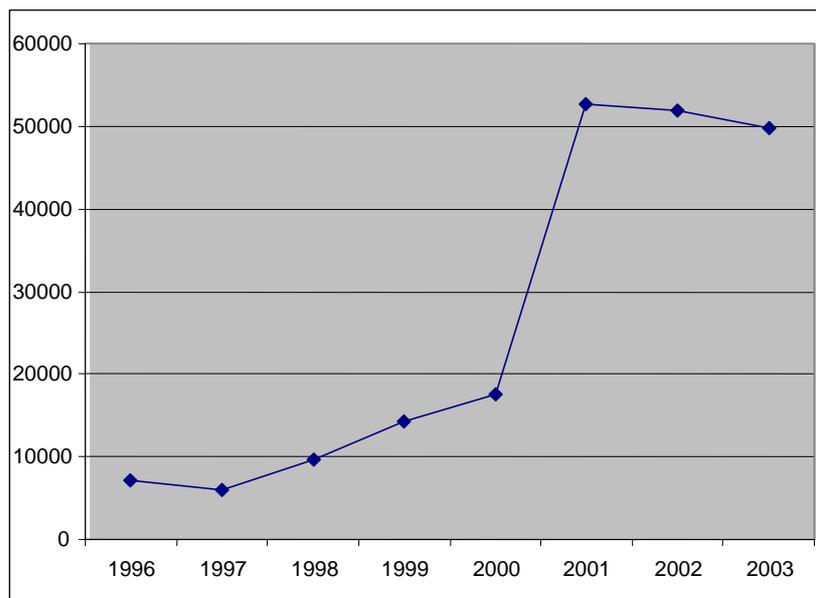
### Relocation Closer to Roads and Trade Structures

Village relocations started in Xieng Khouang in the early 1980s, motivated by several factors (Goudineau, ed. 1997): insecurity related to anti-revolutionary threat; the slash-and-burn eradication policy of relocating excess population from overcrowded areas; and the overall provincial development strategy of defining focal zones where health and education structures are provided to people who settle there. The Goudineau study observed that these three provincial policy objectives have generated a variety of relocations that follow two main trends: at provincial level, an east-to-west move from isolated districts (Nonghet and Mok) to more accessible districts (Kham, Paxay, Pek and Phoukout) and, at sub-district level, a general trend to move closer to roads and to combine isolated villages.

### Urban Development and Urban Consumption Demand

Between 1990 and 2005, the population of Phonsavanh city increased from 15,472 to 34,634 inhabitants (Provincial Department of Statistics, 2005). FAO (1999) evaluated that total per capita meat consumption in Southeast Asia increased from 9.4 to 21 kg/year between 1961 and 1995, with pigs and poultry remaining the main meat sources. In Xieng Khouang, the number of pigs killed for local consumption in official abattoirs (located close to cities) multiplied seven-fold between 1996 and 2003 (see figure 2).

Figure 2: Pigs killed in official abattoirs in Xieng Khouang Province, 1996-2003 (PAFO, 2004)



## **Changes in Rural Farming Systems**

Households surveyed by this study were divided into ten types according to their geographical situation (see figure 1) and food security strategy. Ten different types of household were identified according to their food security strategies. For paddy rice and marketable products, the labour and surface area allocated and the income generated by each type of product were all analysed. The impact of the economic changes occurring in the province appears to be strongly related to the direct physical environment and land access of each particular household.

### **Highland Households (900-1100m)**

This area is mainly covered by acid, infertile savannah grasslands with pine trees. Only 5% of the total surface is cultivated, with rice paddy land representing 80% of this cultivated area (PAFO, 2004). Three types of highland household were differentiated according to land access (see figure 3). When the surface of paddy land per worker is more than 2500 m<sup>2</sup>, households tend to conduct two main activities: paddy rice and livestock production (see figure 4).

Rice crop residues (bran and broken rice) are used to feed pigs and poultry; cattle and buffalo are raised on natural pastureland and fed with rice straw after the harvest. The manure is collected to fertilise the paddy fields. Surplus rice is sold and the proceeds used to purchase lifestyle commodities like a television, motorcycle, or sewing machine. It may also be reinvested into on-farm equipment such as a cultivator, husking machine, tractor or threshing machine. The emergence of new economic opportunities has slightly modified this traditional scheme with (i) more fish ponds (surface area increased four-fold between 1996 and 2003) and more animal sales; (ii) intensification of dry-season legume production (especially garlic and chilli) for local markets; (iii) an increase in silk weaving for sale; and (iv) massive investment in means of transport, from cultivators up to big trucks. When paddy land is lacking, households develop legume and maize production on river borders. Livestock activities with both ruminants and non-ruminants now account for 80-90% of total household income.

### **Lowland Households (500-600m)**

Warmer mean temperatures in the valley allow more diverse production of crops, such as coconut and banana trees, and more intensive cropping systems (two rice crops per year when water is available). In contrast to the highland system, households use both lowland and upland for cropping. Paddy rice, live-stock and cash crops are the basis of the farming systems. Four types of households were differentiated according to land access and upland use (see figure 5). When there is enough paddy land, households diversify into either perennial cash crops (mango and coconut, but mainly banana trees) or annual cash crops (maize or chilli) in the uplands (see figure 6). When paddy land is not sufficient to insure family self-sufficiency in rice, upland rice is then grown. With market growth over the last decade, the importance of cash crop and livestock activities has increased for all types of household. Watermelon, garlic, chilli, maize and bananas, all initially produced for the local market, are now widely exported to Vientiane and Vietnam.

### **Upland and Sloping Area Households (1000-1200m)**

Paddy access is still limited in this area and farming systems are mainly based on slash-and-burn upland rice or maize cultivation, livestock, and gathering (see figure 7). Emergence of new economic opportunities, especially through road construction, has also slightly modified farming systems. There has been an increase in (i) cattle population (up 35% between 1996-2003; PAFO, 2004) and cattle sales; (ii) maize for sale or for pig fattening, with the emergence of non-rice based cropping systems in the limestone area; (iii) income from gathering and hunting for urban demand; (iv) seasonal migration for labour; and (v) investment in transport (motorbikes and small trucks) when rice-self sufficiency is achieved (see in figures 8 and 9).

Figure 3: Diversity of farming systems in the highlands of Xieng Khouang

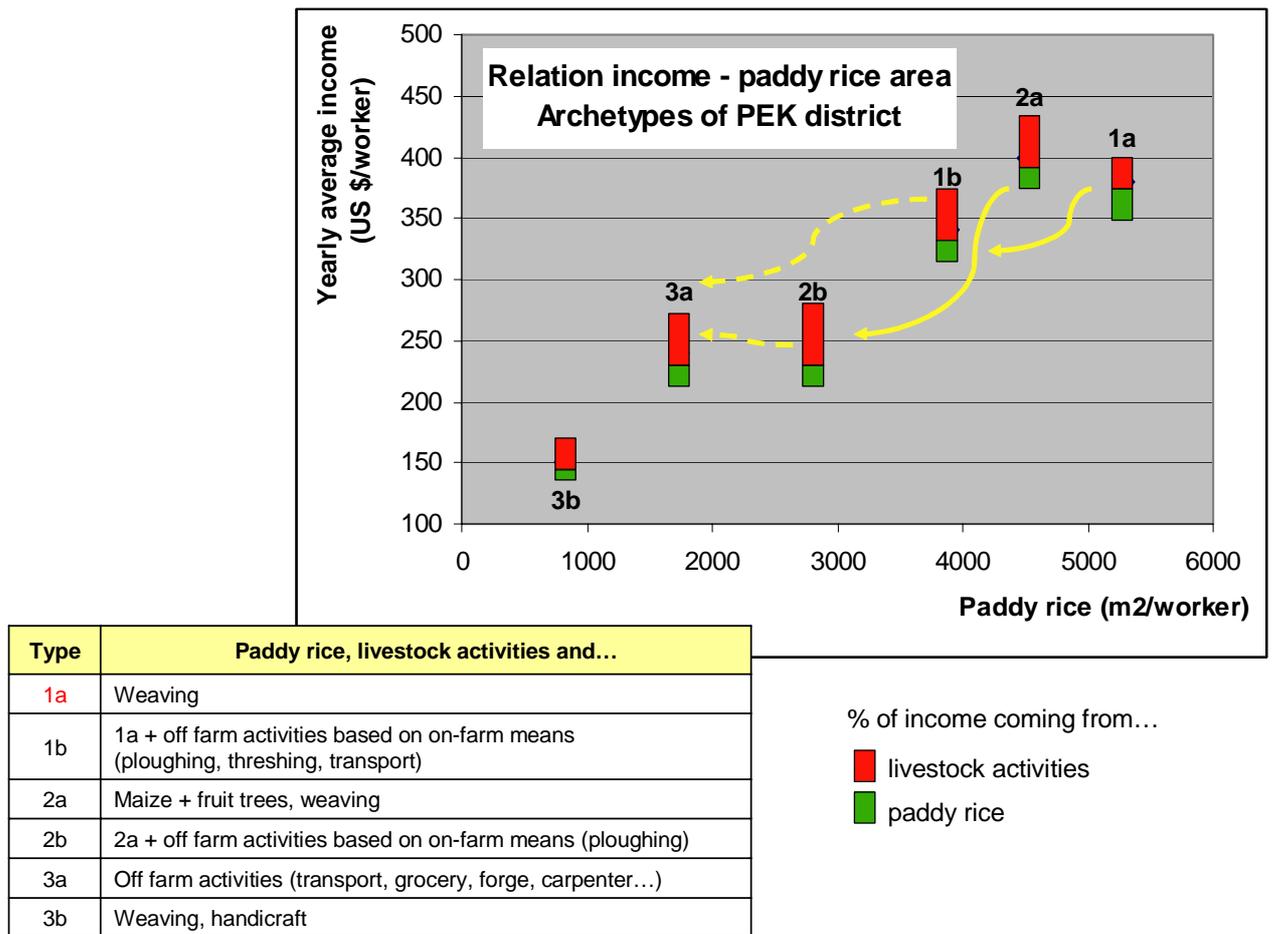


Figure 4: Farming system prevailing in the highlands of Xieng Khouang (type 1a)

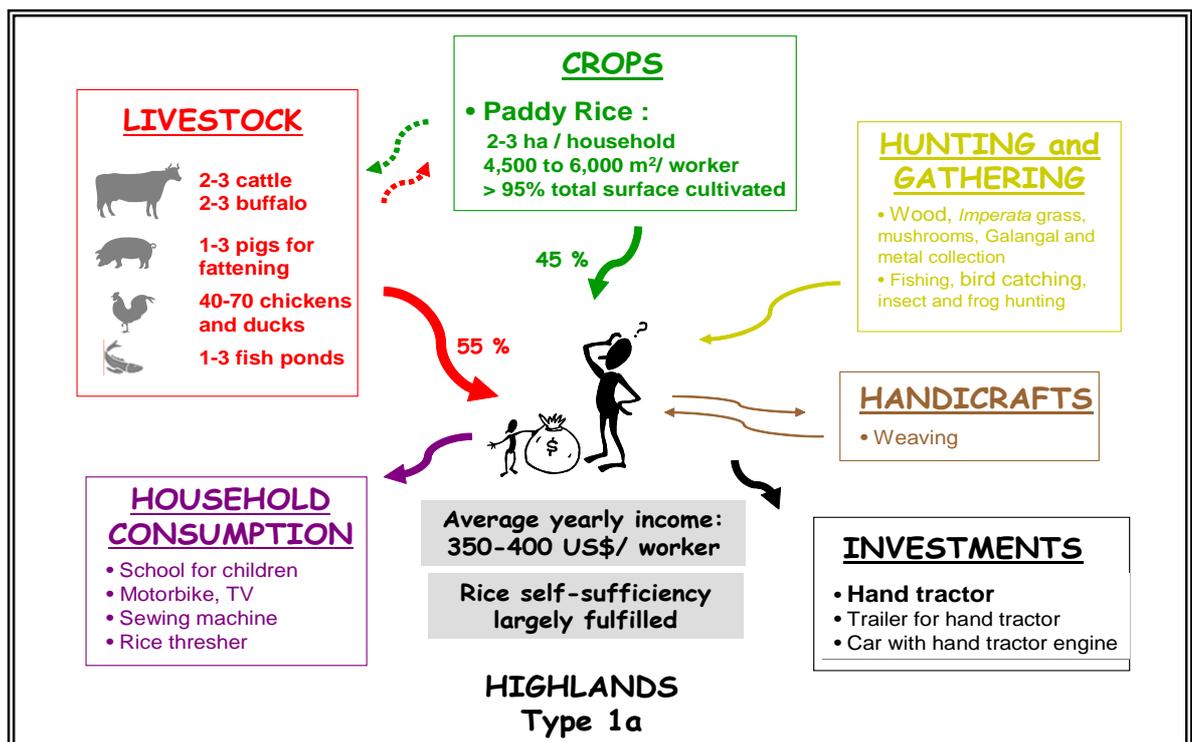
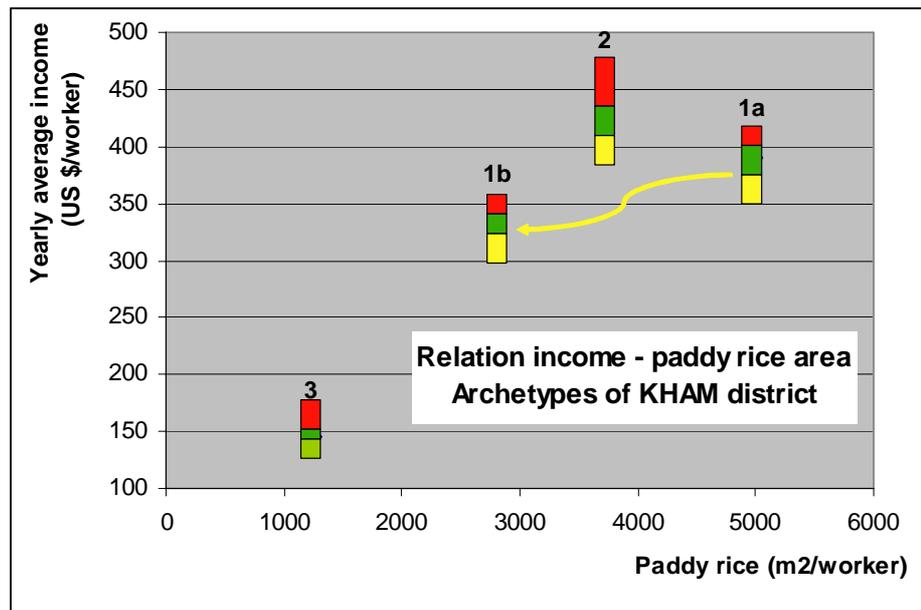


Figure 5: Diversity of farming systems in the lowlands of Xieng Khouang



Types	Upland strategy...
1	Banana trees (++) and chili pepper (+)
2	Maize (+++), chili pepper (+++) and Banana trees (+)
3	Rice (100%)

% of income coming from...

- livestock activities
- paddy rice
- upland rice
- Other crops

Figure 6: Farming system prevailing in the lowlands of Xieng Khouang

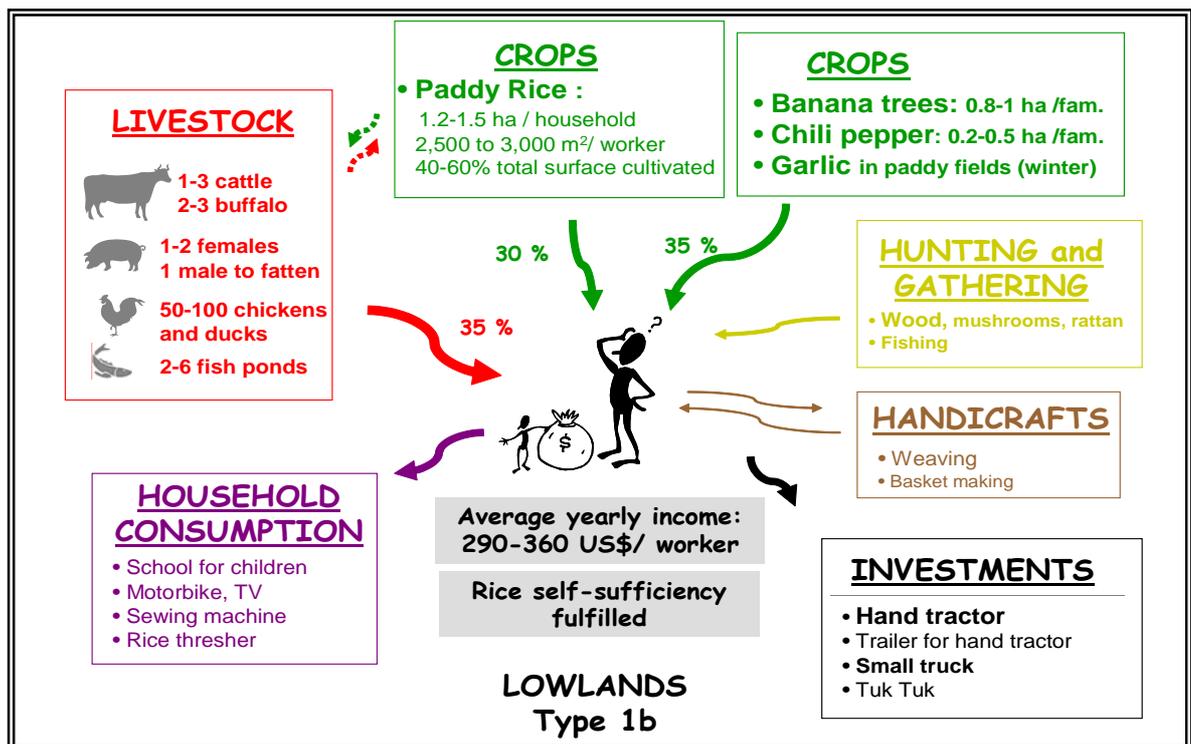
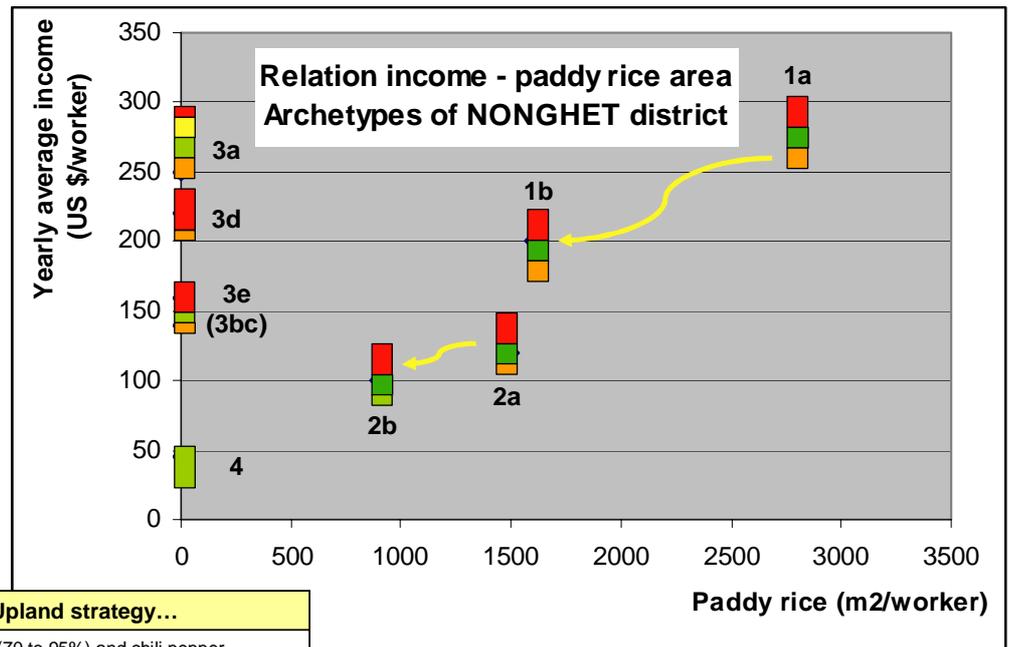


Figure 7: Diversity of farming systems in the uplands of Xieng Khouang



Types	Upland strategy...
1	Maize (70 to 95%) and chili pepper
2a	Maize (80%) and chili pepper (20%)
2b	Rice (100%)
3a	Rice (50%), maize (30%) and chili pepper (20%)
3b	Rice (80%) and chili pepper (20%)
3c	Maize (80%) and chili pepper (20%)
3d	Maize (100%)
3e	Rice (60%), and maize (40%)
4	Rice (100%)

% of income coming from...

- livestock activities
- paddy rice
- upland rice
- Maize
- Other crops

Figure 8: Example of farming system performed in the uplands of Xieng Khouang (type 2a)

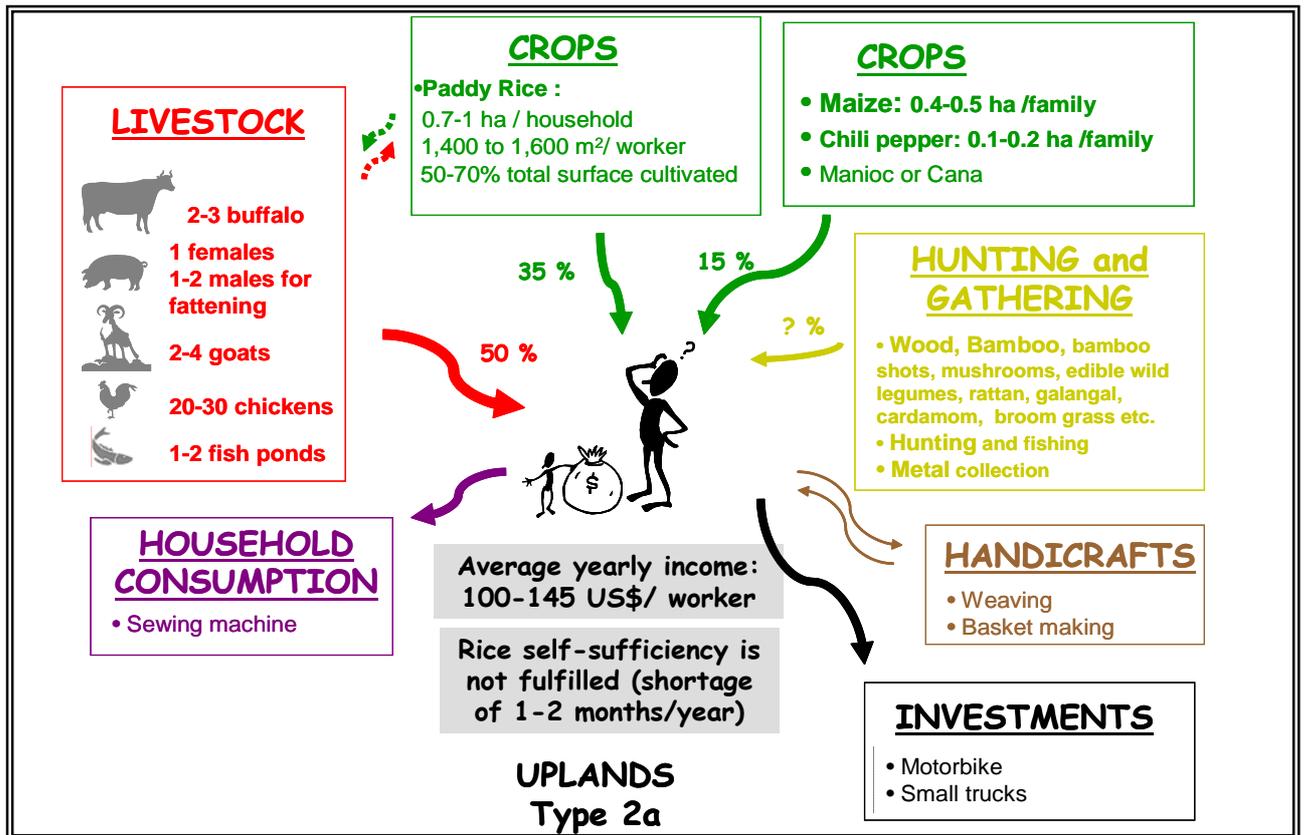
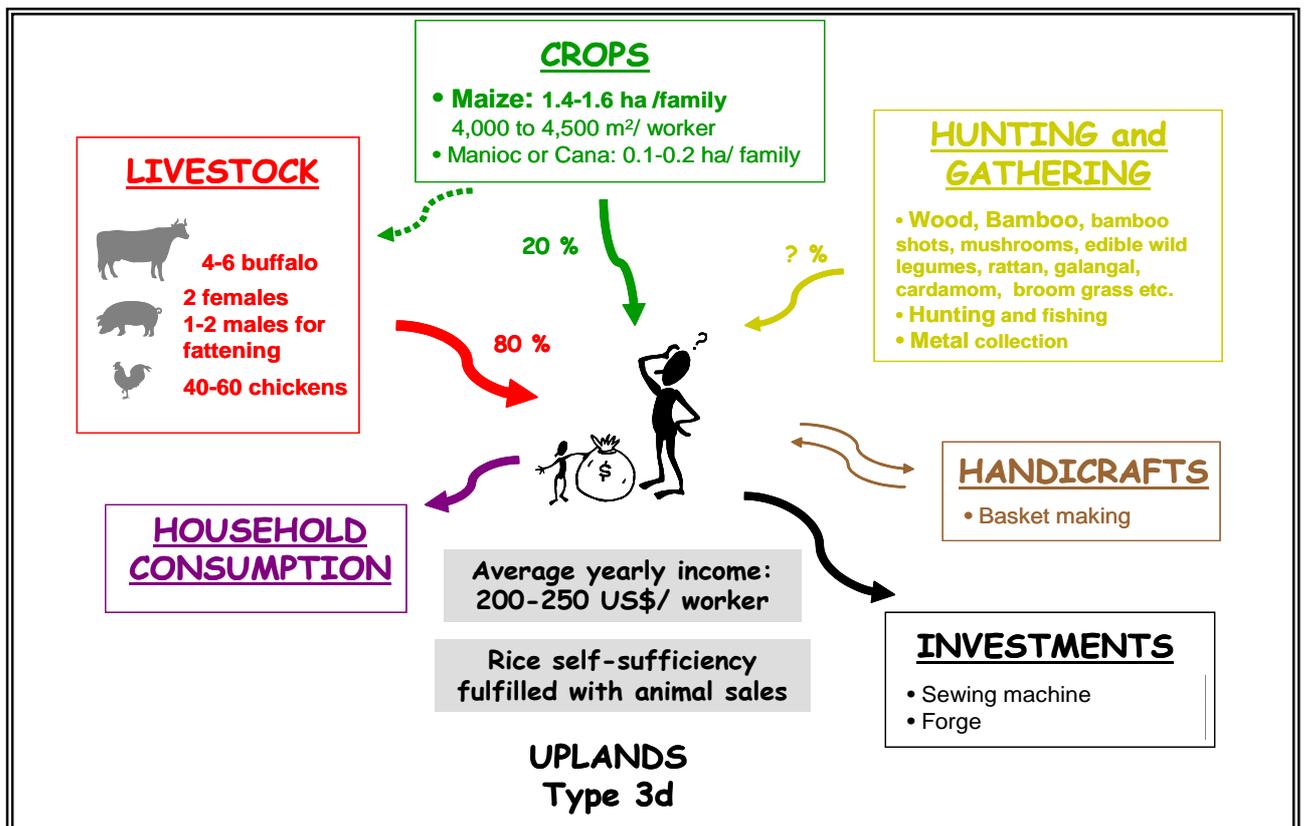


Figure 9: Example of non rice-based farming system increasingly performed in the limestone area of Xieng Khouang (type 3d)



## Conclusion and Recommendations

Upland development strategy for mountainous areas of the Lao PDR is still widely based on the extension of paddy land through irrigation and drainage network improvement, terrace implementation, lowland rice variety improvement and so on. However:

- Paddy rice importance is decreasing in all farming systems surveyed in Xieng Khouang: even when rice remains the main or sole cultivated crop, the income from rice production never exceeds 50% of total generated household income (see figures 3 to 6);
- Costs for paddy land implementation and maintenance are high;
- Projects aiming at extending paddy land have not succeeded in reducing slash-and-burn coverage;
- Expansion of irrigation will add to ever increasing conflicts over water use between rural and urban areas.

Therefore, there is a need for more work on efficient cropping and fodder systems in the uplands, in order to support the steady extension of livestock and cash crops.

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