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

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• Study conducted in 2003 and 2004
• Objective: households typology to be used for NAE Project activities
• Initial hypothesis: Rice crop as the cornerstone of farming systems
  (2 main factors: access to lowland paddy rice and households’ rice self-sufficiency)
About Xieng Khouang Province…

• North-East of Lao PDR, border with Vietnam
• 7 districts, 15880 km2
• Heavily bombed province during Vietnamese war (1960-1975); still many UXOs
• Important migrations of population during years of war; recent resettlement
• Important historical region (Hmong, pathet Lao)
• Interference of opium production in local economy
• Various ecological areas (see after)
About studied area...

- 3 districts, 6980 km²
Methodological approach...

1- Collecting data: how to valorise existing knowledge?
Bibliographical sources and connections to key persons

4 stages

- Provincial statistics data concerning agriculture and demographic evolutions
- Maps: topography, soil and isohyets
- Activity Reports, publications et others documents

- Statistics about villages and rainfall data
- Maps and project targeted areas
- Projects and districts activity reports

- Land allocation maps
- Land use maps
Methodological approach...

2- Observing environment diversity

- Highlands
- Lowlands

- Sloping lands on acid soils
- Sloping lands on lime stones

4 different agro-ecological units

- Landscape, soils and land use diversity
- Villages accessibility
3- Knowledge Deepening / Farming systems understanding
Quantitative and qualitative surveys are realised on targeted farmers groups.

At village level: history, agro-ecological zoning, farming system diversity
- 53 villages surveyed, 22 selected for surveys at farm level

At farm level: rice self-sufficiency, diversification strategies etc.
- 73 households surveyed

At plot level: successive cropping operations and labour requirements
- 34 plots followed during an entire cropping season
Methodological approach...

4- Implementing On-field trials to complete the diagnosis
   Simple trials implemented with and on farmers fields in order to evaluate soil
   and species potentialities and to discuss about their main cropping constraints.

Fields visits

Crops collection
Main results…

• 10 different types identified according to production strategy

• Rice importance still prevailing in remote areas (food security, rice self-sufficiency)

• Emergence of new economic opportunities modifying traditional schemes (towards non rice-based farming systems)

• Differences strongly related to agro-ecological units and land access
New economic opportunities…

• New infrastructure

✓ Strong policy to improve roads and tracks network (since 1991)
✓ Easy transportation of goods from XKH to Vientiane, Vietnam and Houaphanh province
New economic opportunities...

- Relocation closer to roads and trade structure

Provincial relocation policy motivated by several factors (Goudineau et al): insecurity, slash-and-burn eradication policy, Focal zones

Two main trends: East-to-west relocation, closer to roads
New economic opportunities…

- **Urban development and consumption demand**
  
 ✓ Phonsavanh population: 15000 (1990) to 35000 (2005); local pork meat consumption multiplied by 7 in 8 years (1996-2003)
  
 ✓ SE Asia meat consumption evolution: 9.4 (1961) to 21 kg/capita/year (1999) (FAO, 1999); important exportation towards Vientiane and VN
Changes in Rural Farming systems…

Highlands
Highlands (800-1100m)
• Acid infertile savannah grasslands with pine trees
• Lack of phosphorus and Aluminum toxicity
• Only 5% of total surface is cultivated, 80% in paddy rice
• 3 archetypes differentiated according to paddy land access
• Main farming system: rice production in the paddy land and extensive livestock production on the hills
**LIVESTOCK**
- 2-3 cattle
- 2-3 buffaloes
- 1-3 pork for fattening
- 40-70 chicken and duck
- 1-3 fish ponds

**CROPS**
- Rice in Paddy fields:
  - 2-3 ha / household
  - 4,500 to 6,000 m² / worker
  - > 95% total surf. cultivated

**HUNTING and GATHERING**
- Wood, *Imperata* grass, mushrooms, Galanga and metal collection
- Fishing, birds catching, insects and frogs hunting

**HANDYCRAFT**
- Weaving

**INVESTMENTS**
- Hand tractor
- Trailer for hand tractor
- Car made up with hand tractor engine

**HOUSEHOLDS CONSUMPTION**
- School for children
- Motorbike, TV
- Sewing machine
- Rice thresher

**HIGHLANDS**
Type 1a

**Average yearly income:**
350 to 400 US$/ worker

**Rice self-sufficiency largely fulfilled**
### Archetypes of PEK district

**Relation income - paddy rice area**

<table>
<thead>
<tr>
<th>Type</th>
<th>Paddy rice, livestock activities and…</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Weaving</td>
</tr>
<tr>
<td>1b</td>
<td>1a + off farm activities based on on-farm means (ploughing, threshing, transport)</td>
</tr>
<tr>
<td>2a</td>
<td>Maize + fruit trees, weaving</td>
</tr>
<tr>
<td>2b</td>
<td>2a + off farm activities based on on-farm means (ploughing)</td>
</tr>
<tr>
<td>3a</td>
<td>Off farm activities (transport, grocery, forge, carpenter…)</td>
</tr>
<tr>
<td>3b</td>
<td>Weaving, handicraft</td>
</tr>
</tbody>
</table>

**% of income coming from…**
- Livestock activities
- Paddy rice
Main occurring changes…

• Increase of fish ponds (surface x4, 1996-2003), and animal sales
• Intensification of dry-season legume production (garlic and chili)
• Increase of silk weaving activity for sale
• Massive investment in means of transport
Changes in Rural Farming systems...
Lowland (500-600m)

- Warm valley, allowing more crops diversification
- Different soil quality (from sandy soils to lime stones)
- Use of both lowlands and uplands
- 3 archetypes differentiated on land access and upland use
- Main trend: rice in the paddy land and cash crops on the hills (maize, chili pepper, banana)
**LIVESTOCK**
- 1-3 cattle
- 2-3 buffaloes
- 1-2 female
- 1 male for fatten.
- 50-100 chicken and duck
- 2-6 fish ponds

**CROPS**
- **Rice in Paddy fields:**
  - 1.2-1.5 ha / household
  - 2,500 to 3,000 m² / worker
  - 40-60% total surf. cultivated
- **Banana trees:** 0.8-1 ha / fam.
- **Chili pepper:** 0.2-0.5 ha / fam.
- **Garlic in paddy fields (winter)**

**HOUSEHOLDS CONSUMPTION**
- School for children
- Motorbike, TV
- Sewing machine
- Rice thresher

**INVESTMENTS**
- Hand tractor
- Trailer for hand tractor
- Small truck
- Touk touk

**LOWLANDS**
Type 1b

**Average yearly income:**
290 to 360 US$/ worker

**Rice self-sufficiency fulfilled**

**HUNTING and GATHERING**
- Wood, mushrooms, rattan
- Fishing

**HANDYCRAFT**
- Weaving
- Basket making
<table>
<thead>
<tr>
<th>Types</th>
<th>Upland strategy...</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Banana trees (+++) and chili pepper (+)</td>
</tr>
<tr>
<td>2</td>
<td>Maize (+++), chili pepper (+++) and Banana trees (+)</td>
</tr>
<tr>
<td>3</td>
<td>Rice (100%)</td>
</tr>
</tbody>
</table>

% of income coming from...
- livestock activities
- paddy rice
- upland rice
- Other crops
Main occurring changes…

• Increase cash crop activities: watermelon, garlic, chili, maize and bananas
• Increase of livestock activities
Changes in Rural Farming systems…
Uplands (1000-1300m): 2 ecological situations

- Acid soils
- Main trend: upland rice and cassava on steep slopes

- Better soils on lime stones
- Main trend: maize based systems for pig fattening

- More diverse farming systems integrating crops, livestock and gathering activities
- 4 archetypes differentiated on access to paddy land and food security strategy
**LIVESTOCK**
- 2-3 buffaloes
- 1 female
- 1-2 male for fat.
- 2-4 goats
- 20-30 chicken
- 1-2 fish ponds

**CROPS**
- **Rice in Paddy fields:**
  - 0.7-1 ha / household
  - 1,400 to 1,600 m²/ worker
  - 50-70% total surf. cultivated
- **Maize:** 0.4-0.5 ha / fam.
- **Chili pepper:** 0.1-0.2 ha / fam.
- **Manioc or Cana**

**HOUSEHOLDS CONSUMPTION**
- Sewing machine

**HUNTING and GATHERING**
- Wood, Bamboo, bamboo shots, mushrooms, edible wild legumes, rattan, galangal, cardamom, broom flower etc.
- Hunting and fishing
- Metal collection

**HANDYCRAFT**
- Weaving
- Basket making

**INVESTMENTS**
- Motorbike
- Small trucks

**UPLANDS**
- Type 2a

**Average yearly income:** 100 to 145 US$/ worker

**Rice self-sufficiency is periodically not fulfilled (1-2 months/year)**

50%
LIVESTOCK
- 4-6 buffaloes
- 2 female
- 1-2 male for fat
- 40-60 chicken

HUNTING and GATHERING
- Wood, Bamboo, bamboo shots, mushrooms, edible wild legumes, rattan, galangal, cardamom, broom flower etc.
- Hunting and fishing
- Metal collection

CROPS
- Maize: 1,4-1,6 ha /fam.
  4.000 to 4.500 m²/ worker
- Manioc or Cana: 0,1-0,2 ha/ fam

HOUSEHOLDS CONSUMPTION

INVESTMENTS
- Sewing machine
- Forge

HANDYCRAFT
- Basket making

Average yearly income: 200 to 250 US$/ worker

Rice self-sufficiency fulfilled with animals sales

UPLANDS
Type 3d
Archetypes of NONGHET district

<table>
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<tr>
<th>Types</th>
<th>Upland strategy…</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maize (70 to 95%) and chili pepper</td>
</tr>
<tr>
<td>2a</td>
<td>Maize (80%) and chili pepper (20%)</td>
</tr>
<tr>
<td>2b</td>
<td>Rice (100%)</td>
</tr>
<tr>
<td>3a</td>
<td>Rice (50%), maize (30%) and chili pepper (20%)</td>
</tr>
<tr>
<td>3b</td>
<td>Rice (80%) and chili pepper (20%)</td>
</tr>
<tr>
<td>3c</td>
<td>Maize (80%) and chili pepper (20%)</td>
</tr>
<tr>
<td>3d</td>
<td>Maize (100%)</td>
</tr>
<tr>
<td>3e</td>
<td>Rice (60%), and maize (40%)</td>
</tr>
<tr>
<td>4</td>
<td>Rice (100%)</td>
</tr>
</tbody>
</table>

% of income coming from...
- livestock activities
- paddy rice
- upland rice
- Maize
- Other crops
Main occurring changes…

Increase in:

• Cattle population (up 35% between 1996-2003) and cattle sales
• Maize surface for sale and/or pig fattening (emergence of non-rice based cropping systems)
• Income coming from gathering/hunting activities for urban demand
• Seasonal migration for labor
• Investment in transport
Conclusion…

Upland development strategy for mountainous areas of the Lao PDR is still widely based on paddy land extension whereas:

• Paddy rice importance is decreasing in all farming systems surveyed: even when rice remains the main or sole cultivated crop, the income from rice production never exceeds 50% of total generated household income;
• 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.
Thank you for your attention!

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