Impact of maize expansion on landscapes and livelihoods in Lao PDR:

A case study in Xieng Khor district, Hua Phan Province

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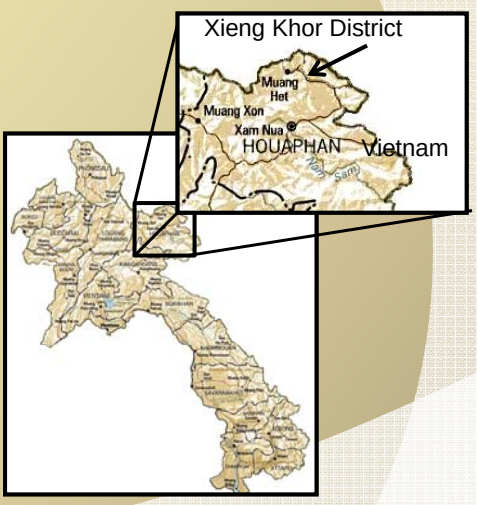
Location & context

- Xieng Khor district is one of the 47 poorest district in Laos
- Xieng Khor district is located at the border with Vietnam
- Villages are situated in lowland (300m altitude)
- Since 2005 maize production has spread in the district pushed by Vietnamese investments
- Natong Kumban includes 9 villages
- We have studied 5 of them



The Research Site: Natong Kumban

- 5 villages: Natong (720 inhab.), Nanong (#377), Xiengdaene (#199), Nadeua (#270) and Phuk (#592)
- 4 ethnic groups: Tai Dam, Khmu, Ksing Mool and Yao
- 3 main production system: upland rice in shifting cultivation, paddy rice in lowland and maize cropping system on the slopes

Methodology

- Exhaustive rapid survey of all households in the 5 villages (360 HH),
- In-depth survey of 100 households in 4 villages,
- 6 Thematic focus group in each villages (maize, upland rice, paddy, gathering & garden, livestock),
- Participatory mapping cross-checked by direct landscape observation, and village meeting,
- Final workshop with local stakeholders: presentation and validation of results, scenario analysis

Content

I. Access to lowlands determine farmers' strategies in the upland fields
II. Maize led to a major shift from rice-based subsistence production system to commercial agriculture
III. Is maize production sustainable in the Natong cluster?

3 main periods -> policy frameworks and local adaptations

Lowland access determine farmers strategies in upland fields

The Na Muong system

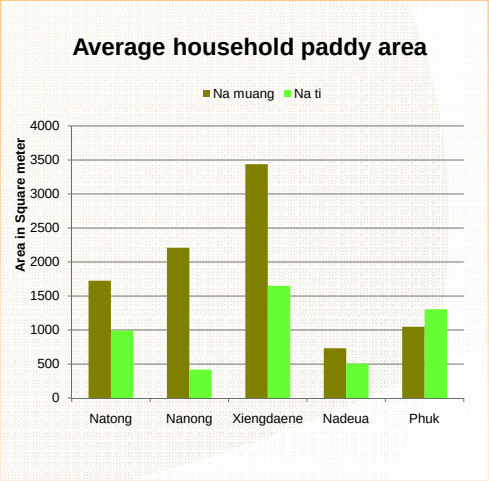
- Old Tai dam land sharing system for the paddy fields
- Paddy fields are redistributed within the community every 5 years depending on the household size
- As a result, a majority of households get access to highly productive fields in lowland

1975 - intensification of the lowland production

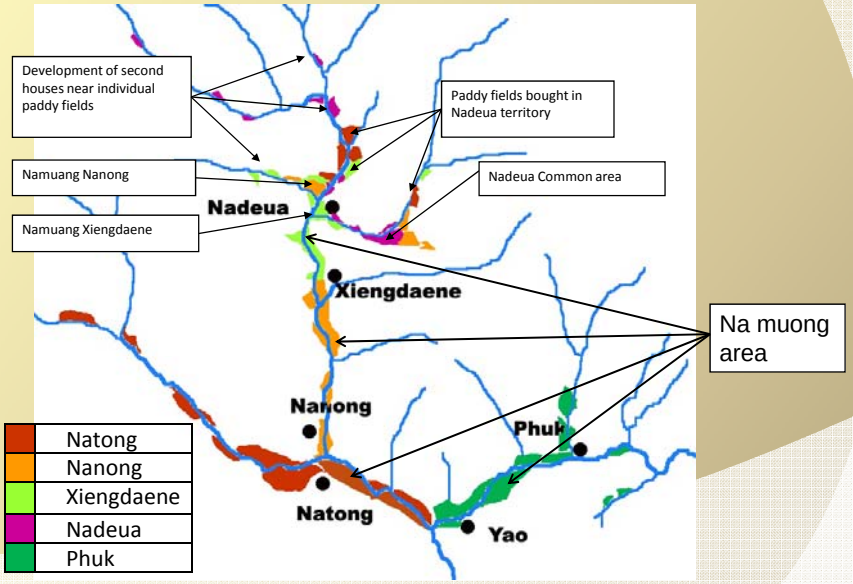
- Resettlement of Khmu and Ksing Mool village in Nadeua and Phuk
  - Limited access to paddies
  - Increase pressure on lowland
- Cooperatives in the lowlands
  - Na Muong area was expanded by including individual paddy fields (NaTi).
  - Farmers started to produce in dry season

1980's - paddy redistribution

- After the end of the cooperatives, farmers started again to build Na Ti,
- Farmers started to sell the rare individual paddy fields between villages -> resulting in a real patchwork of paddy land ownership
- Important disparities in paddy areas between households and between villages



Lowland ownership patchwork



1997 - land use planning

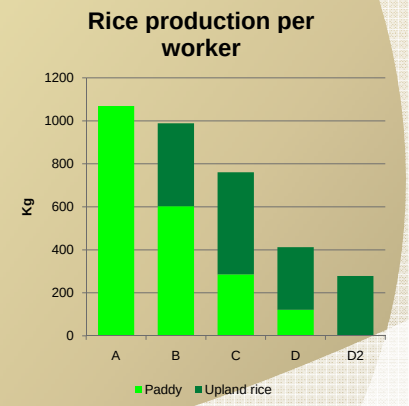
- Focal zones development policy
  - Yao village were moved from highland to valley
  - Na Tia (Ksing mool) were mixed with Natong
- Land use planning
  - In 1997, the representatives of 5 villages met to draw village boundaries
  - Villagers didn't push any further the land use planning

	Borders
	River s
	Forest cover

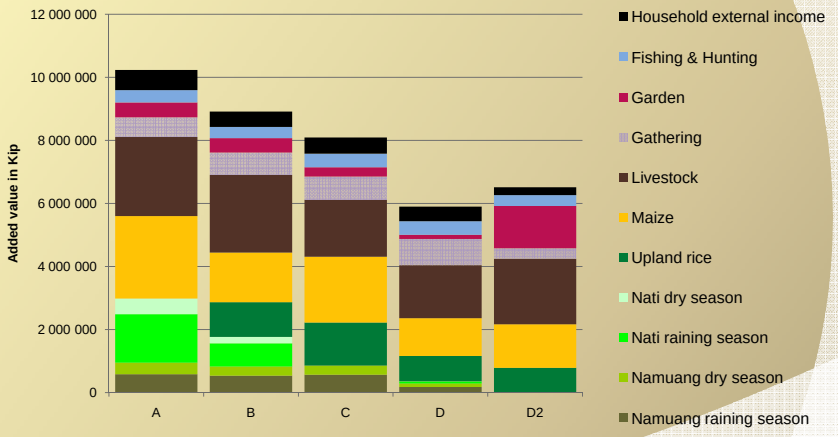
Farming system typology

- Based on HH access to lowland fields

	Typology criteria			
Type	Common paddy field	Individual paddy field	Upland rice	Household Equipment
A	Yes	Yes large area	No	Small tractor Motorbike Rice mill TV
B	Yes	Yes middle area	Yes	Small tractor Motorbike Rice mill TV
C	Yes	No	Yes	Motorbike Rice mill
D	small area or none	No	Yes	Motorbike
D2	No	No	Yes	None



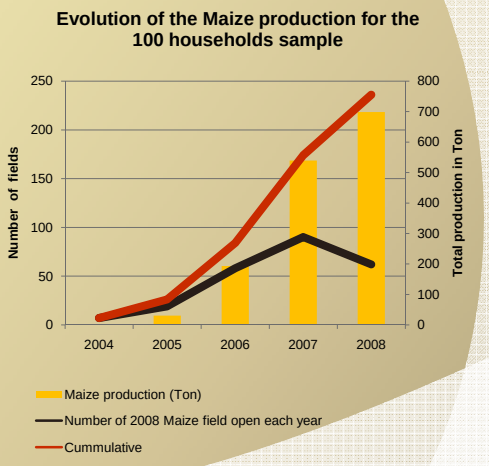
Composition of the Household's gross added value per worker



Maize led to a major shift from rice-based subsistence production system to commercial agriculture

Maize success story

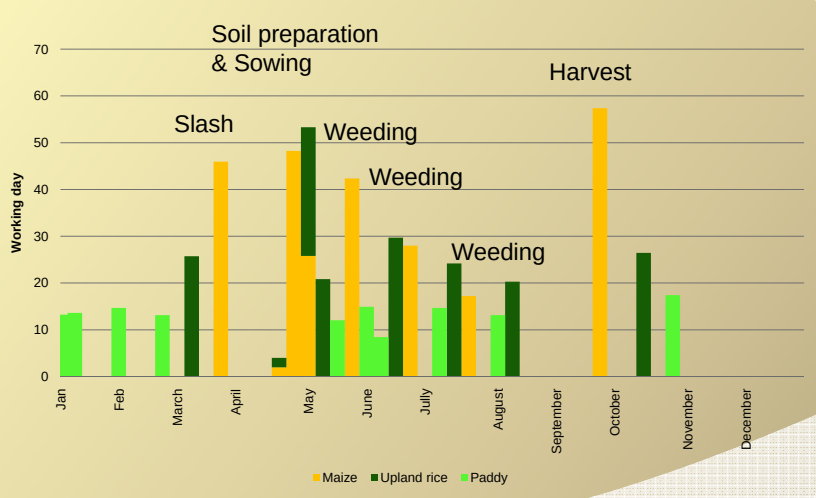
- In 2005, first try by local farmers
- In 2006, Vietnamese traders came to sell seeds and to buy production
- In 2007 farmers built “maize roads”
- In 2008 all households grew maize and more roads were built



Maize cropping system

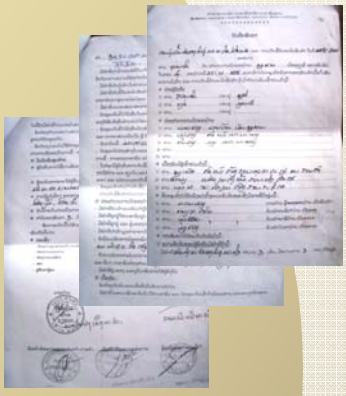
- Slash and burn without rotation on slopes
- No tillage
- Hybrid seeds LVN10 sown with a stick
- No herbicide nor chemical fertilizer
- Sometimes associate with pumpkin or chili
- In 2008, an average household sowed 26 Kg of seeds and harvested nearly 7 tons of corn cob sold at 810 kip/kg.

Labor calendar



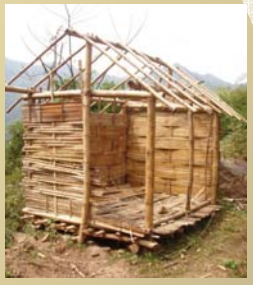
The "maize" roads

- Vietnamese traders provided credit for maize roads,
- Farmers built 35 Km for 370 Millions Kip (in two phases),
- Traders signed 3 or 5 years contracts with the village community,
- Contracts terms include total repayment cost, reparation of the road, seed supply and purchase of the harvest without exclusivity,
- Road repayments are mostly shared within the entire community



Why did farmers need maize roads?

- Maize yield: 4690 kg/ha
- Upland rice yield: 936 kg/ha,
- Basically, it requires 4 to 5 times more labor to harvest maize than upland rice,
- Traders provide a service package: roads allow trucks to come directly near the fields to collect the harvest.
- Farmers have just to build a maize store (2 ton capacity) and bargain with the trader

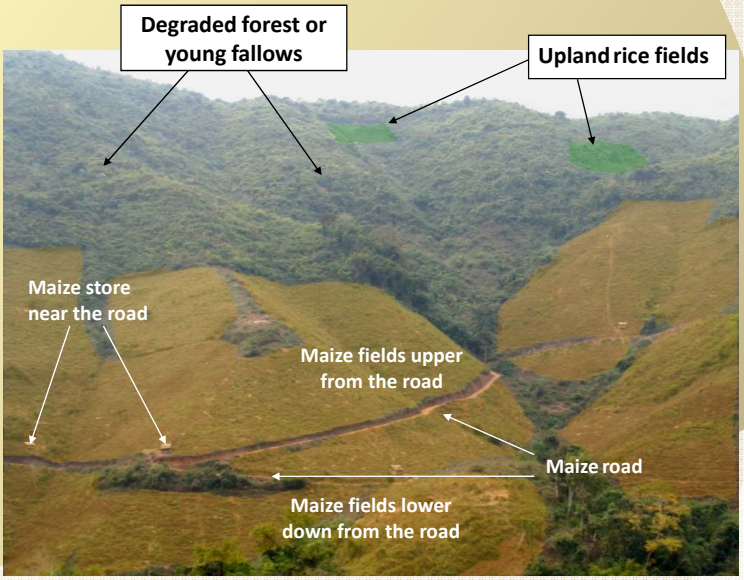


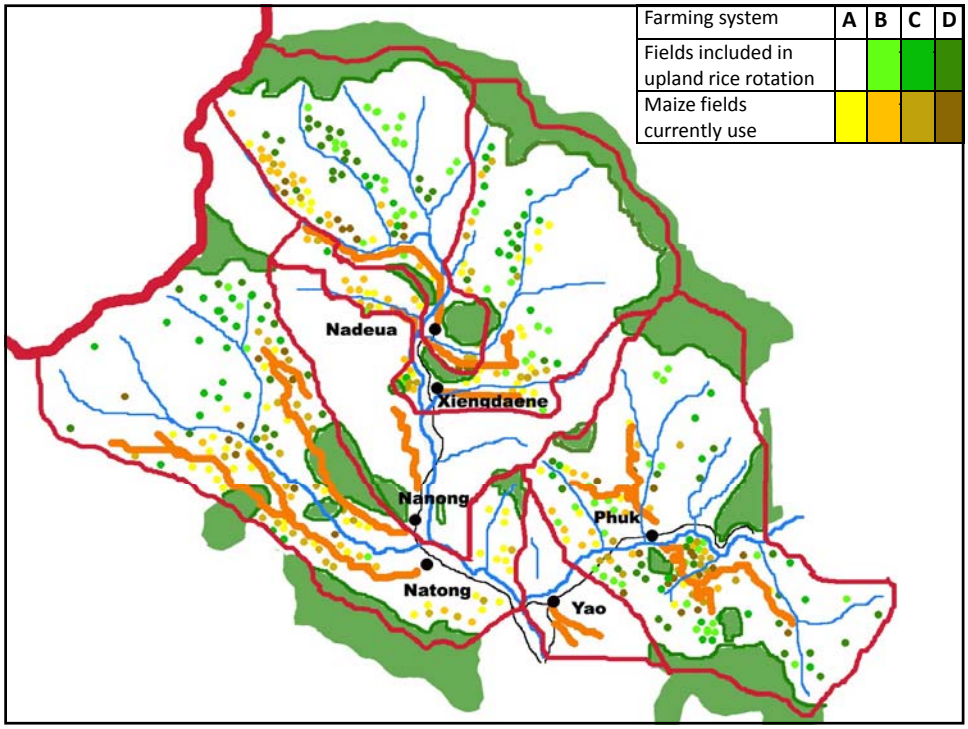
The road role game

Modeling the emergence of local arrangements for building maize roads

- In the 1st group, discussions led to equality of access to the new road
- In the 2nd group, to 2 of 8 farmers without access to the new road
- Outcome depend on the leadership attitude during the negotiation
- Understanding the emergence of new collective rules in order to facilitate:
  - further negotiations for natural resources management,
  - emergence of new local institutions

A new landscape





Apparition of new stakeholders: The middlemen

- Middlemen help Vietnamese traders with different activities;
  1. They provide seeds
  2. Translation during road negotiation
  3. Bargain for the traders
  4. Provide rice or money credits
- They could get important external income (37 millions Kip a year for one of them)
- They get new social position in the village

The only house with paint walls belong to a middleman

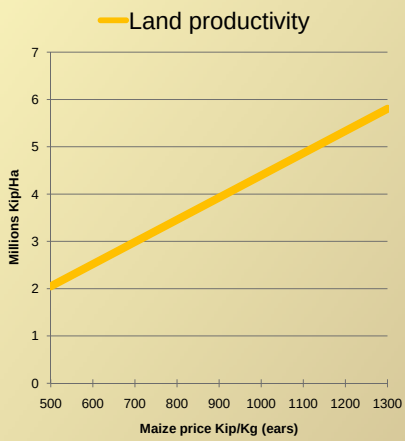
Economic
Environmental
Social

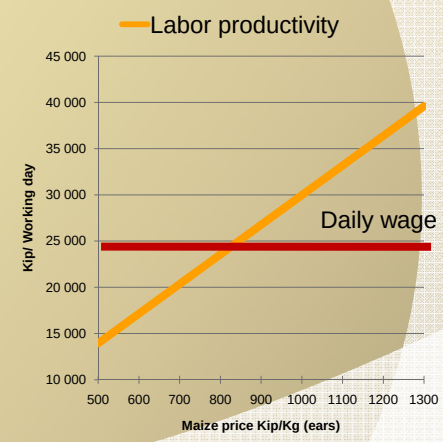
Is maize production sustainable in Natong cluster?

Productivity analysis

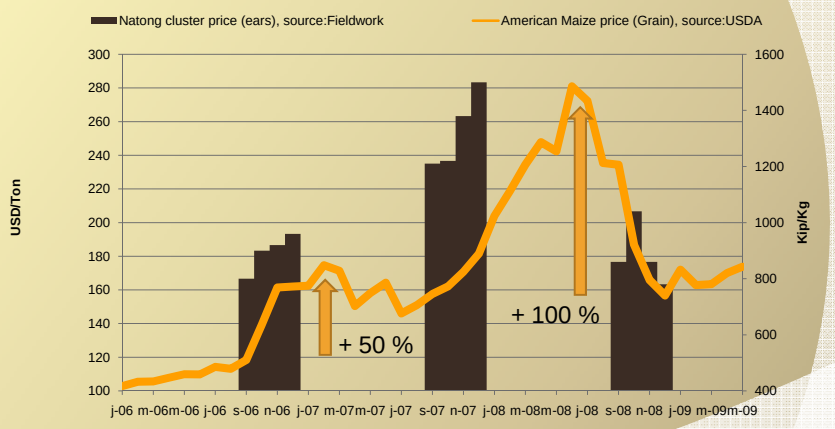
- Maize return on labor is higher than upland rice
- If we consider fallows, maize return on land reaches 6 millions kip/ha compared to 1 million kip/ha for upland rice
- But differences are slight compared to lowland production system

Maize productivity depends on market price





Maize price fluctuations



Maize price game

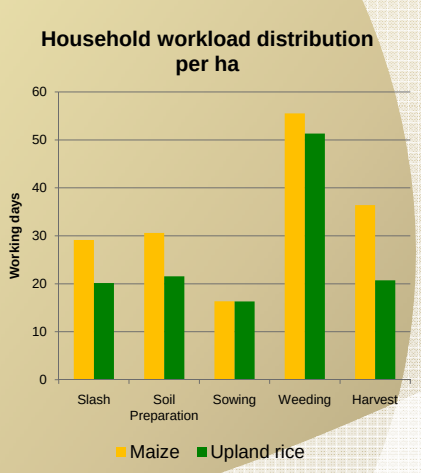
Modeling farmers attitude toward price variation

Results:

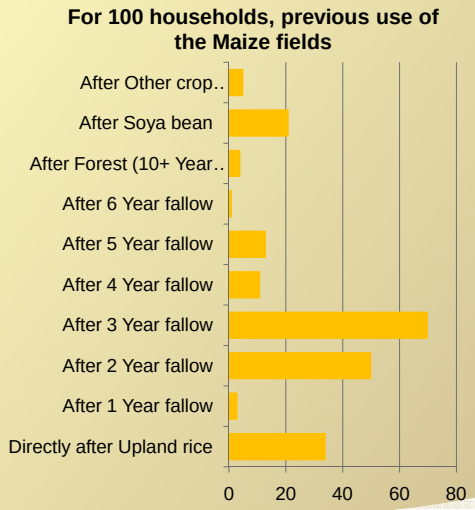
- Majority of HH prefer to mix upland rice and maize production (risk management),
- During the game farmers decided not to reduce their maize area when maize price went down,
- When maize price increased, farmers expanded their cropping area despite the absence of information on price.

Workload comparison

- During discussions with farmers, maize seemed to be an easy crop,
- But data we collected show that maize requires more labor than upland rice,
- Especially for harvest (maize road effect included),
- Weeding also requires the same amount of labor as upland rice,
- Maize expansion leads to an increase of labor requirements.



Maize replaces shifting cultivation



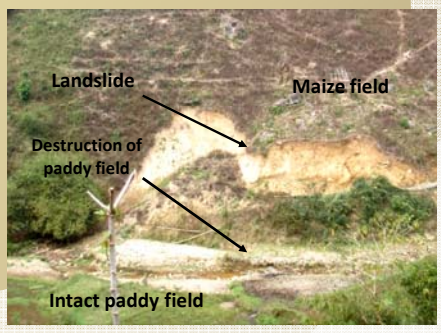
- 3 year old fallow rotational system is replaced by maize monocropping,
- Forest has not been converted to maize (was gone before),
- Expansion of maize area is the main source of income increase

Dependency on credit

- Rapid spreading of credits provided by traders,
- Increase in debt default rate,
- Some farmers are trapped into a debt cycle without possibilities to invest,
- Collective debts also difficult to repay. In three years Nadeua only repaid **2,3 millions Kip of the 27 millions Kip** contract,
- In 2009, economic downturn drew away maize investors -> more difficult to repay for local villagers.

Erosion increase

- Maize is not associated with a cover crop,
- Monocropping leads to 2-3 times more area slashed and burned,
- The fallow-dominant mosaic landscape is replace by large areas under monocropping



Loss of fertility

- Erosion leads to important soil and chemical fertility loss
- Maize yield: 5 Tons of ears/ha
- Upland yield: 1 Ton of rice/ha
- Biomass exportation is not compensated by organic or chemical fertilizer

Conclusions (+)

- Maize production in the 5 villages contributed to alleviate poverty by increasing farmers income,
- Farmers have used maize income to invest in roads, to improve their livelihood (rice mill, motorbike, small tractor), to build new concrete houses and to invest in the education of their children,
- Because of communities strength a majority of farmers could benefit from this new production,
- Maize led to the apparition of a agribusiness scheme in the community

Conclusions (-)

However:

- Current maize cropping system is not sustainable and farmers will have to adapt it to maintain their income,
- Farmers are now more vulnerable to prices fluctuations,
- Some farmers could be pushed to migrate or become landless farmer,
- Apparition of middlemen, with financial and social power not linked with lowland, could disrupt the Na Muong system and the community cohesion.

From diagnosis to action…

- With villagers and DAFO staff, we have organized a workshop to share these results and discuss about possible interventions by OXFAM HK supported project (2-3 July 2009),
- Farmers have reacted to our proposed scenarios and developed their own scenarios and action plans,
  - They have expressed their preference for conservation agriculture,
  - Other solutions such as tree plantations, livestock and NTFP management didn't meet the same success.
- A strong leadership (XD headman) emerged from the workshop, with a development vision for the village cluster.
- OXFAM HK is now working on implementing conservative agriculture methods in the villages with a group of volunteer households.

Thank you for your attention!