

International Symposium
Towards Sustainable Livelihoods and Ecosystems in Mountainous Regions
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Impact of Urban Development and Market Access on Farming Systems Evolution in Xieng Khouang Province, Lao PDR

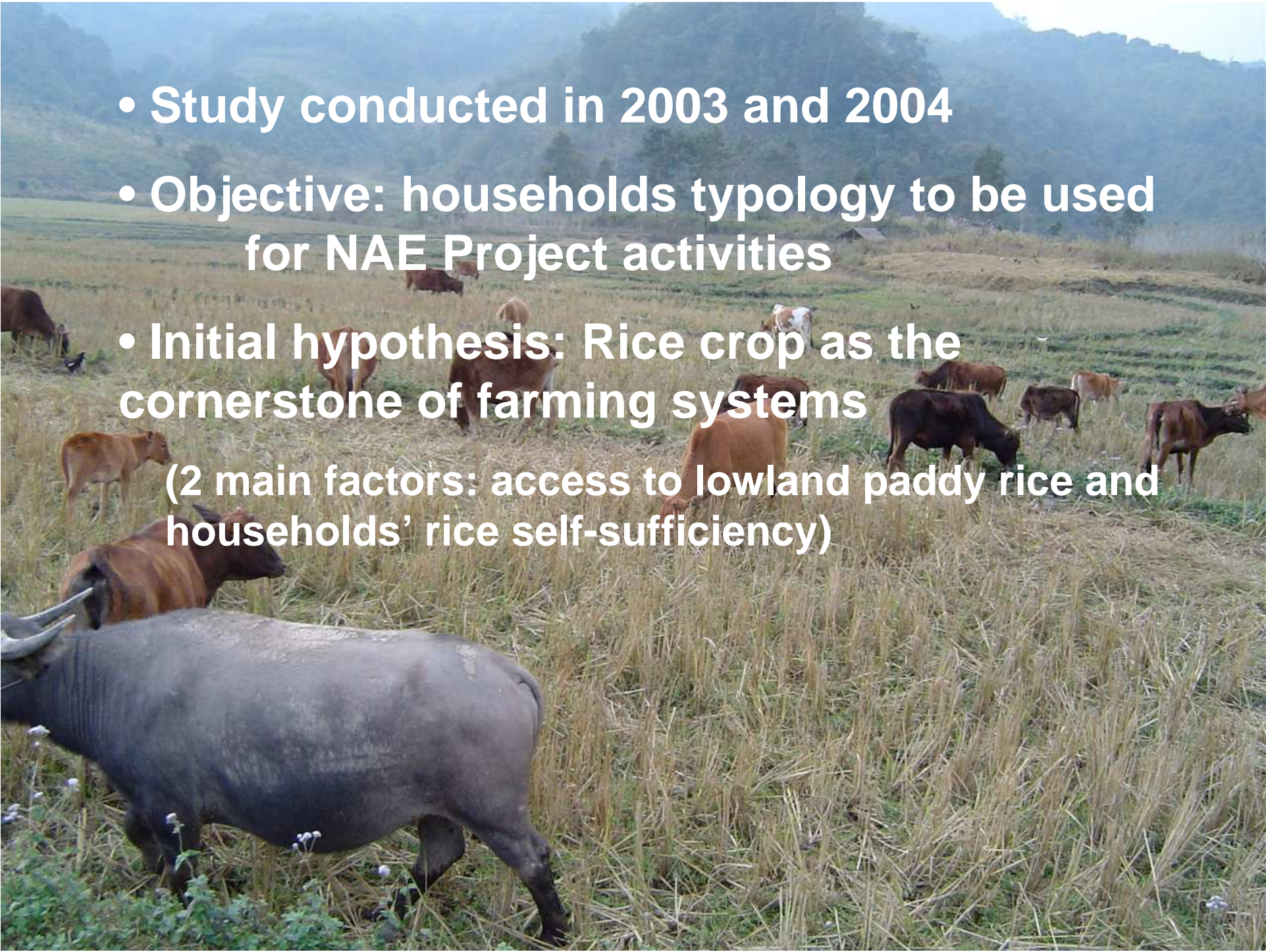
P. LIENHARD, G. DANGE, M-P. TALON, S. SYPHANRAVONG and T. SOSOMPHOU



Lao National Program of Agroecology

**Provincial Agriculture and Forestry Office
Xieng Khouang Province**



- 
- 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)

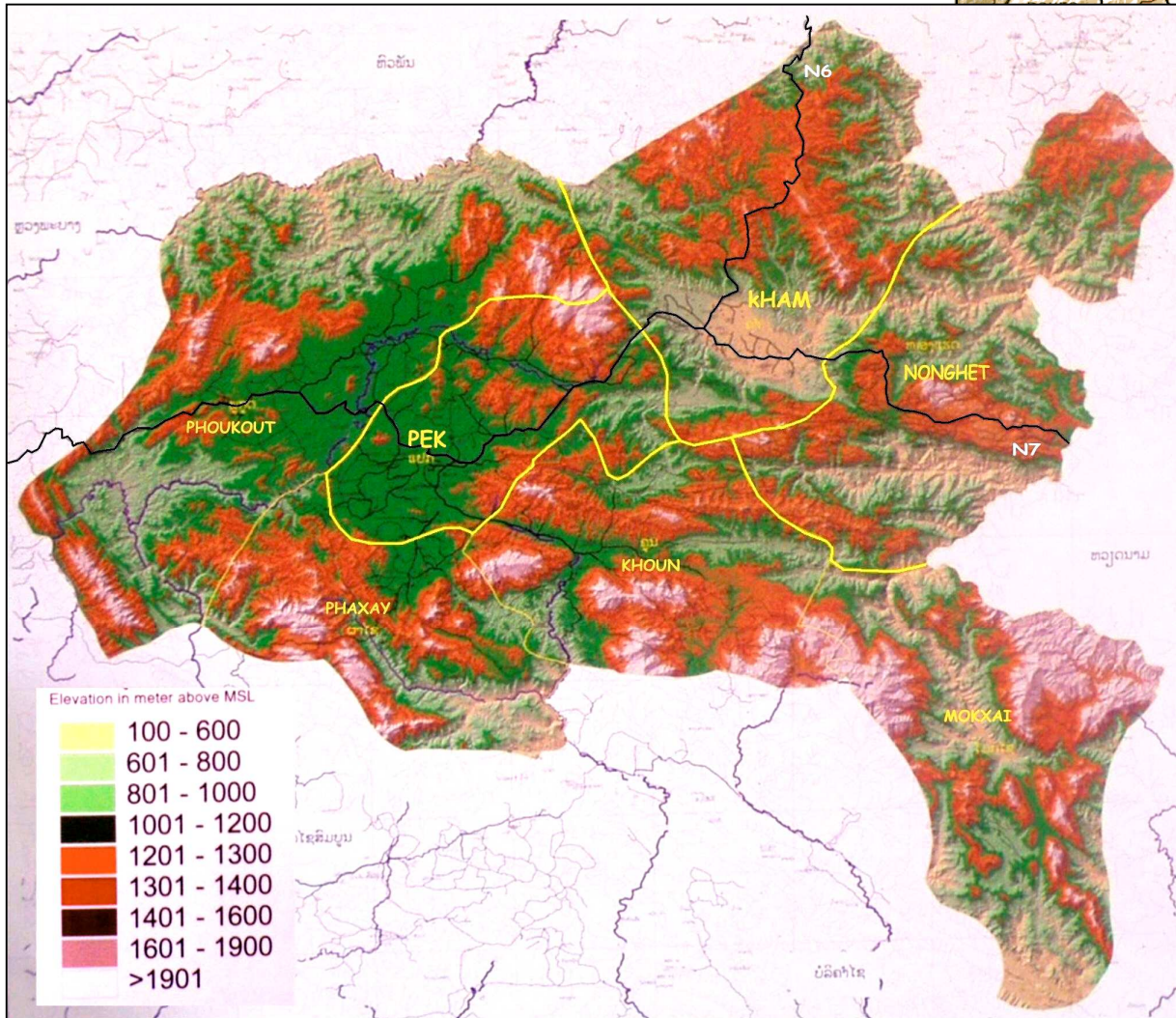
About Xieng Khouang Province...

- 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...

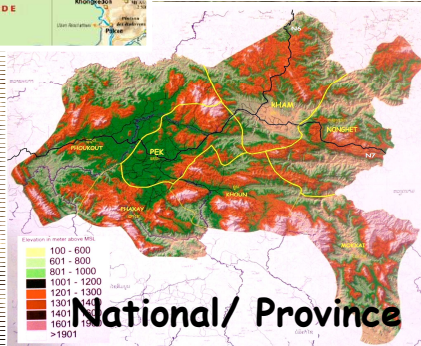
- **3 districts, 6980 km2**



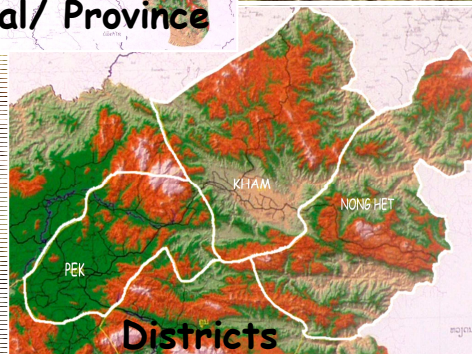
Methodological approach...

4 stages

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



- ❑ 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



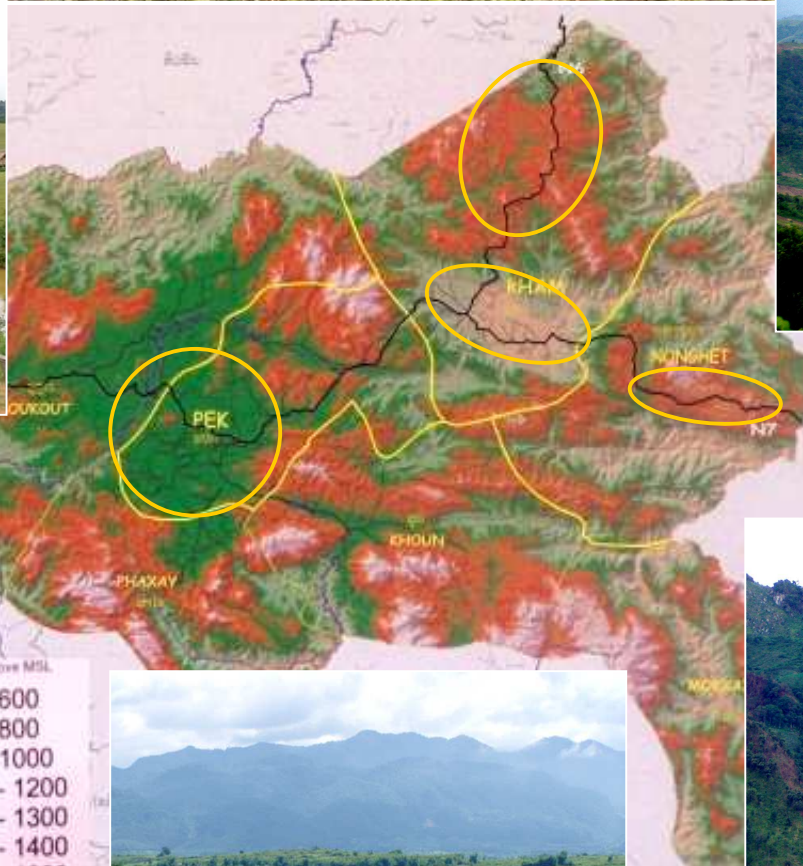
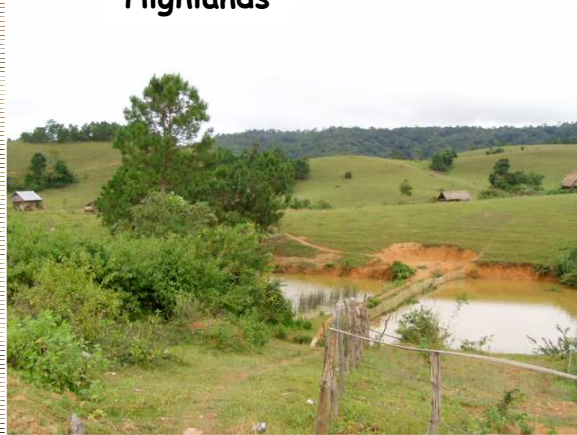
- ❑ Land allocation maps
- ❑ Land use maps

Methodological approach...

2- Observing environment diversity

- Landscape, soils and land use diversity
- Villages accessibility

Highlands



Sloping lands on acid soils



Sloping lands on lime stones

4 different agro-ecological units



Lowlands

Methodological approach...

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

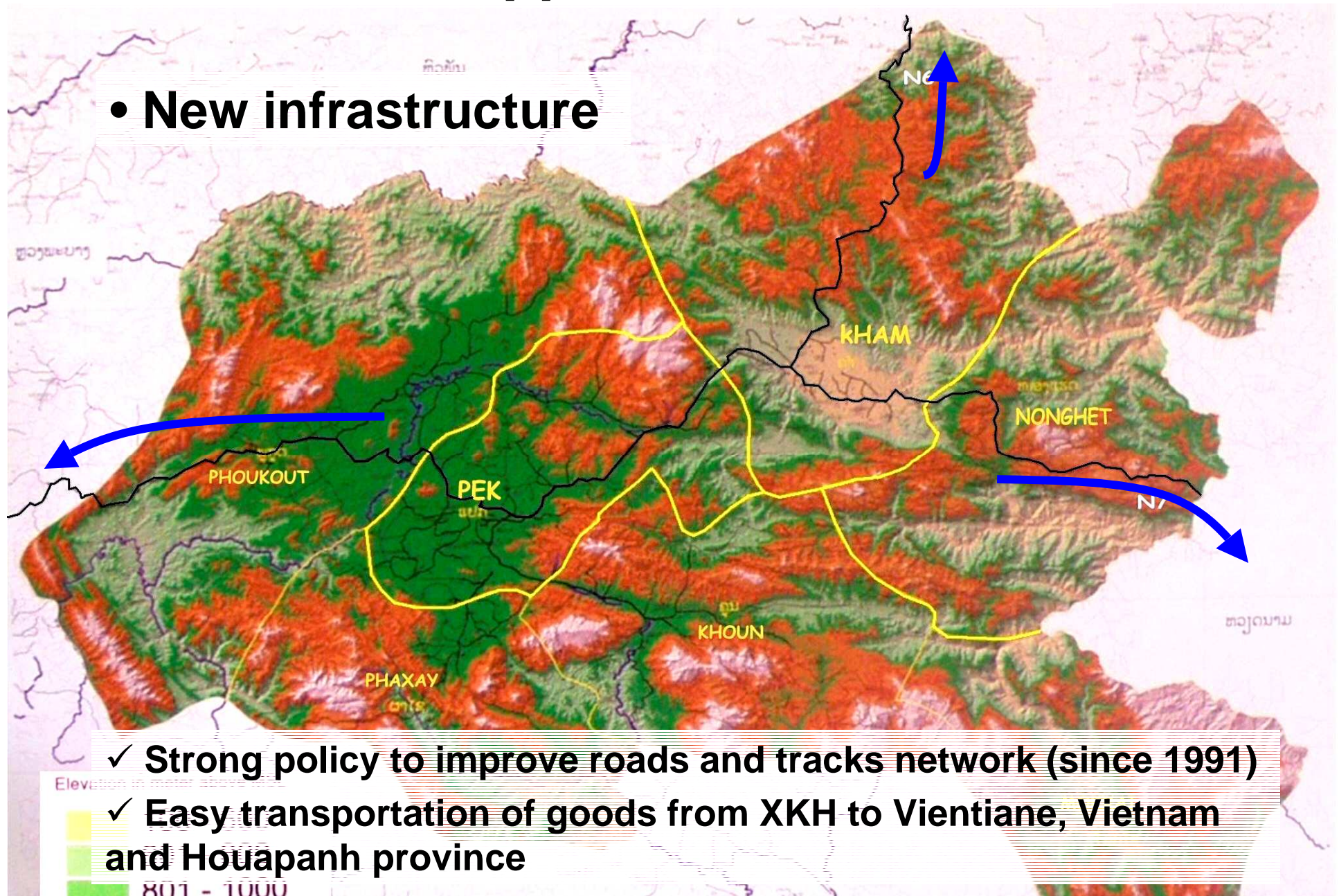


Main results...

- **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**

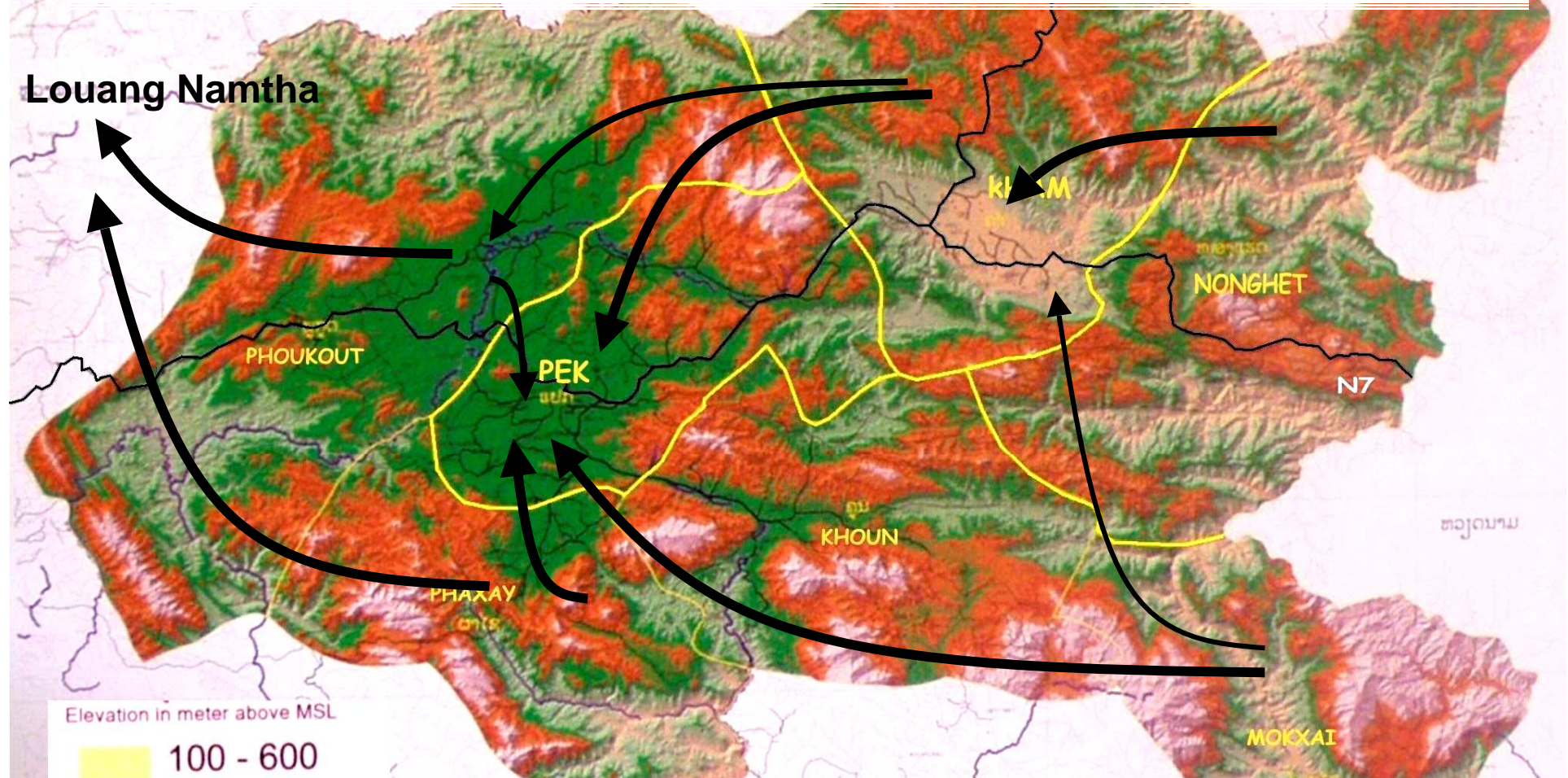
New economic opportunities...

- New infrastructure



New economic opportunities...

- Relocation closer to roads and trade structure

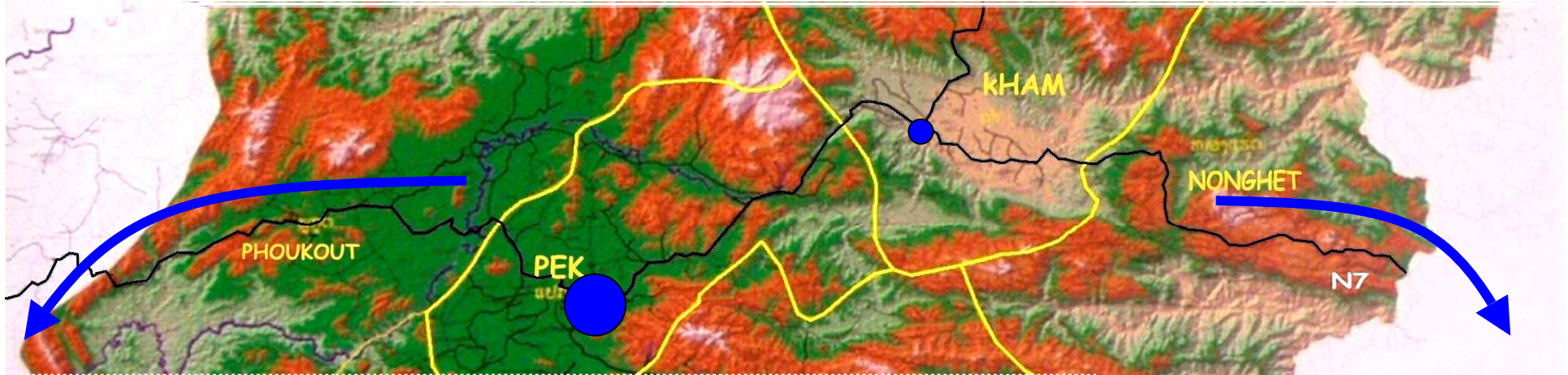


- ✓ Provincial relocation policy motivated by several factors (Goudineau et al): insecurity, slash-and-burn eradication policy, Focal zones
- ✓ Two main trends: East-to-west relocation, closer to roads

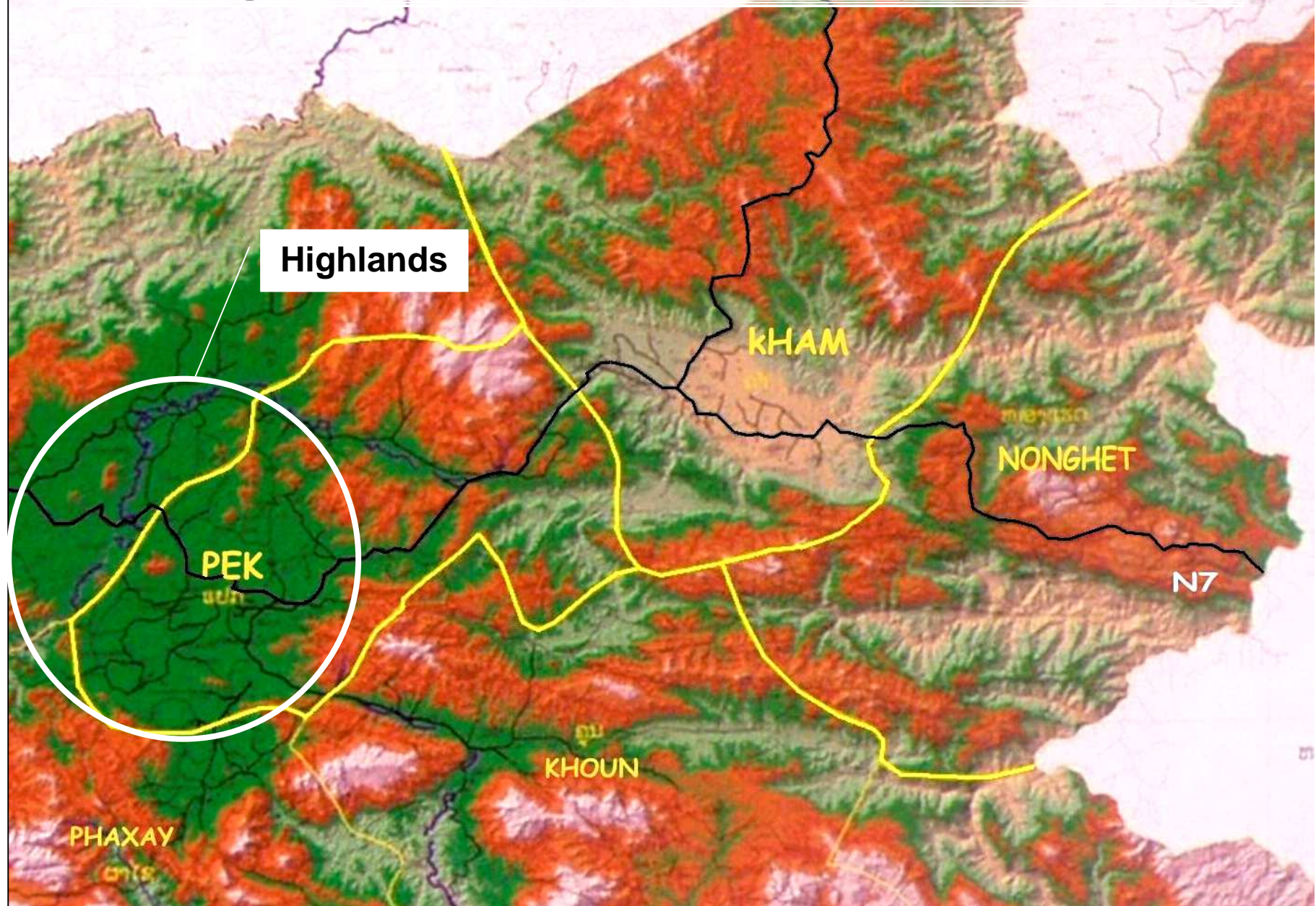
New economic opportunities...

- **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 (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

HOUSEHOLDS CONSUMPTION

- School for children
- Motorbike, TV
- Sewing machine
- Rice thresher

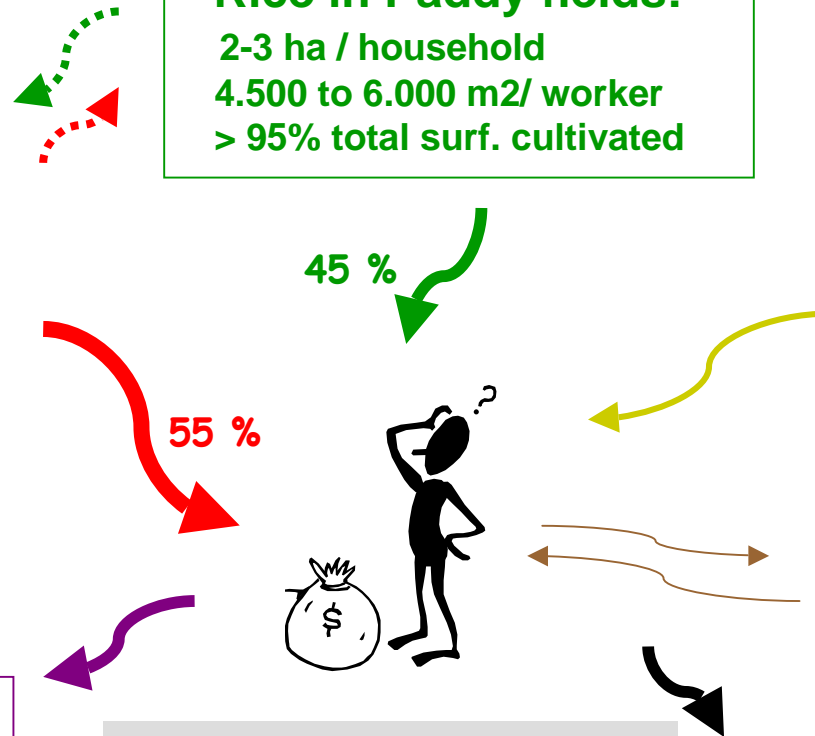
Average yearly income:
350 to 400 US\$/ worker

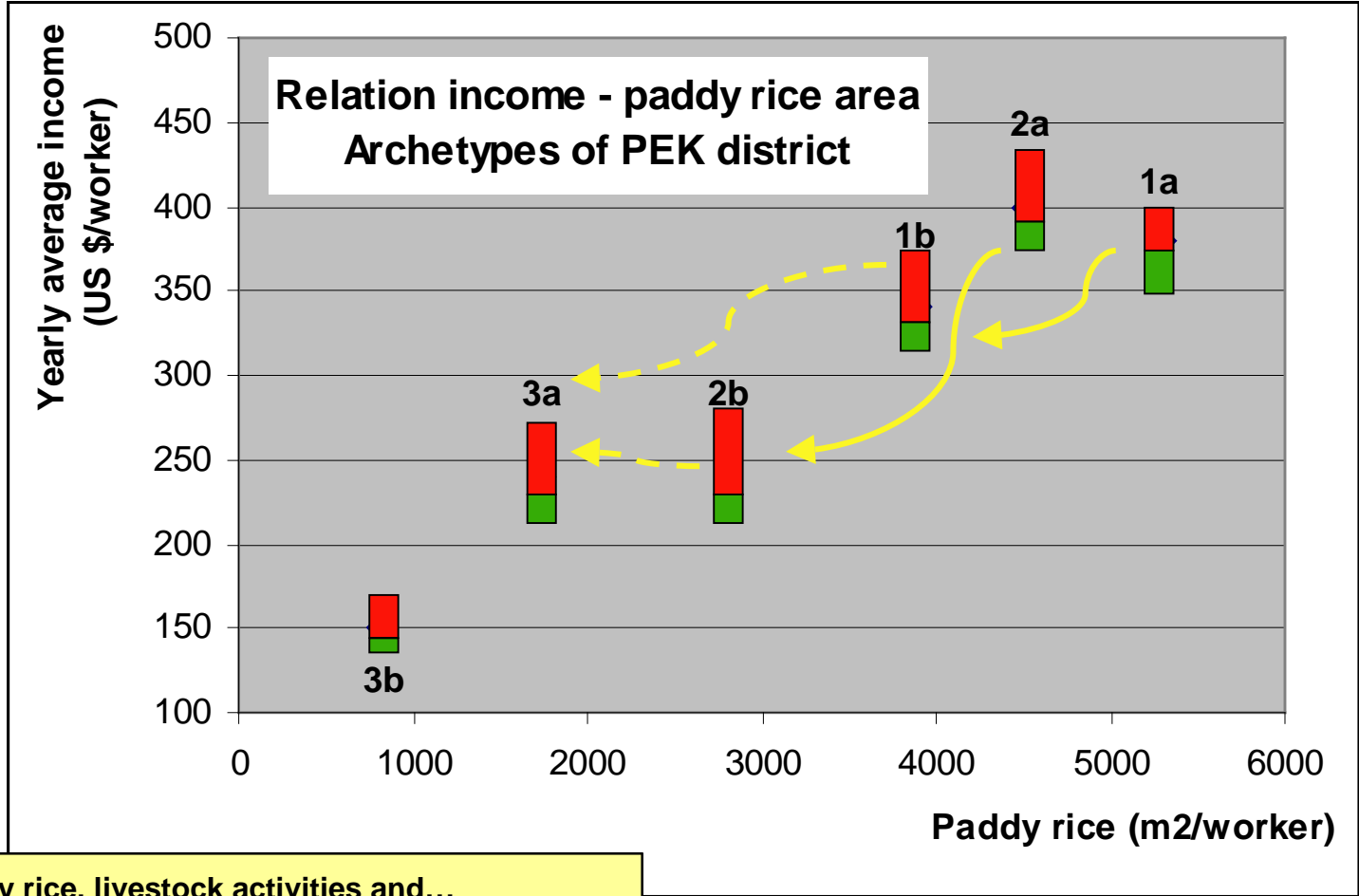
Rice self-sufficiency
largely fulfilled

INVESTMENTS

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

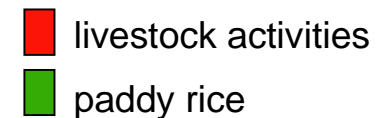
HIGHLANDS
Type 1a





Type	Paddy rice, livestock activities and...
1a	Weaving
1b	1a + off farm activities based on on-farm means (ploughing, threshing, transport)
2a	Maize + fruit trees, weaving
2b	2a + off farm activities based on on-farm means (ploughing)
3a	Off farm activities (transport, grocery, forge, carpenter...)
3b	Weaving, handicraft

% of income coming from...

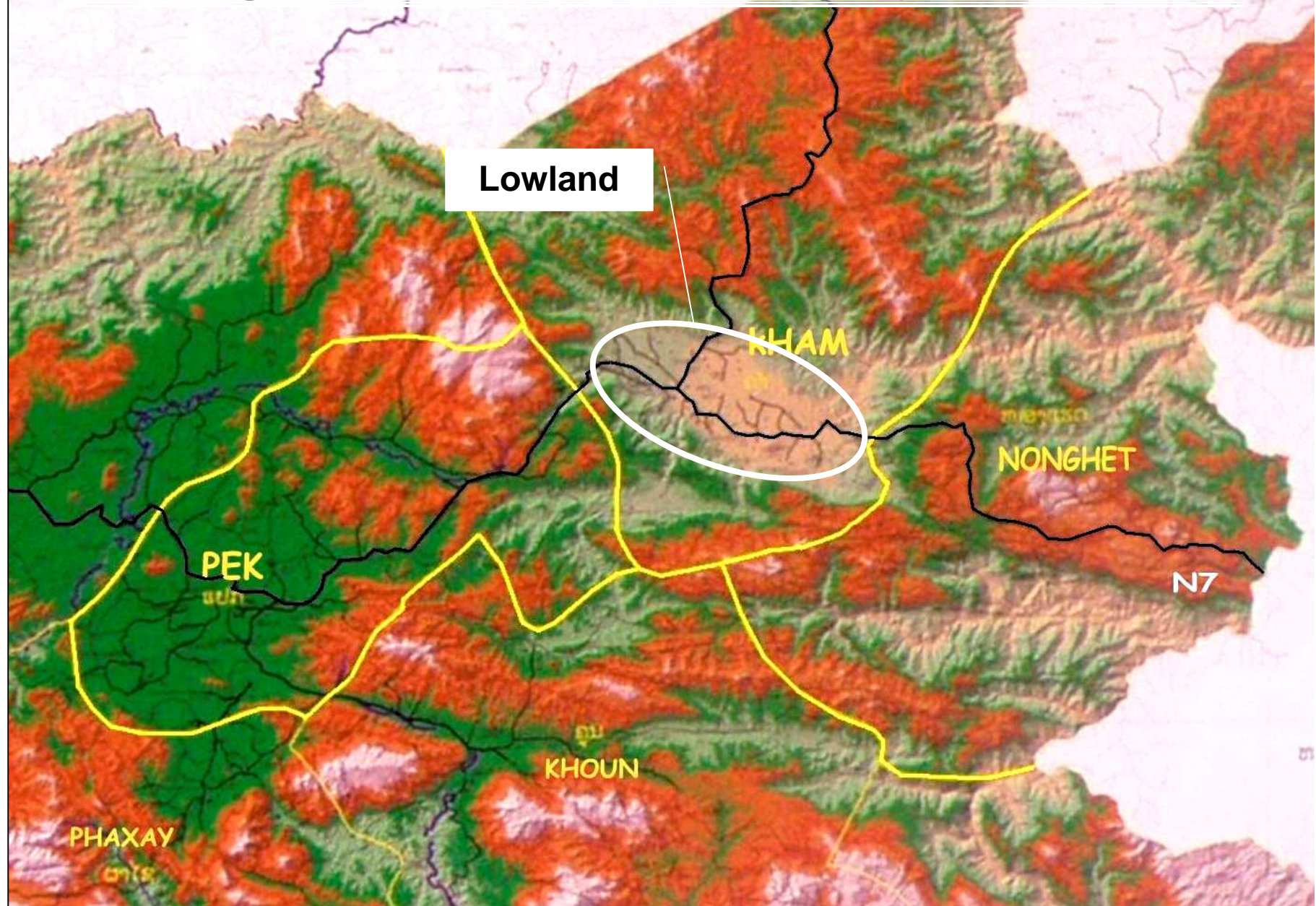


Main occurring changes...

- 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

HOUSEHOLDS CONSUMPTION

- School for children
- Motorbike, TV
- Sewing machine
- Rice thresher

CROPS

- **Rice in Paddy fields:**
1,2-1,5 ha / household
2.500 to 3.000 m²/ worker
40-60% total surf. cultivated

CROPS

- **Banana trees:** 0,8-1 ha /fam.
- **Chili pepper:** 0,2-0,5 ha /fam.
- **Garlic in paddy fields** (winter)

HUNTING and GATHERING

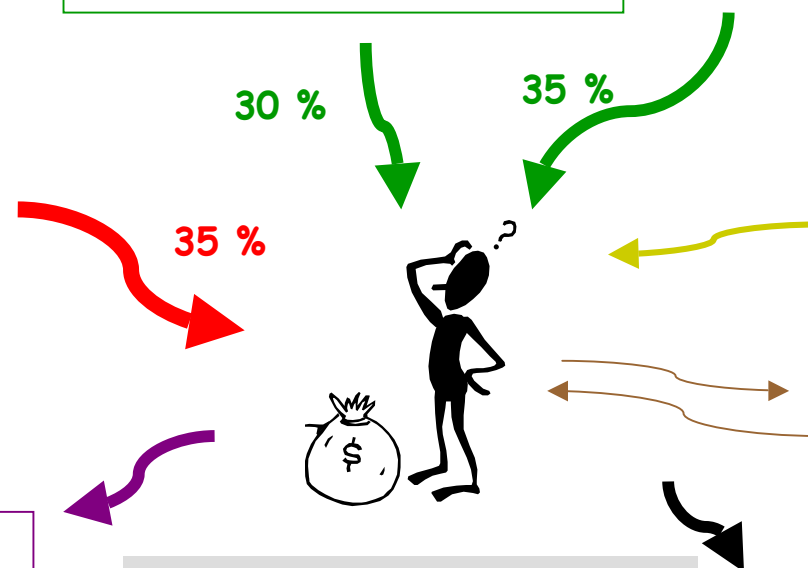
- Wood, mushrooms, rattan
- Fishing

HANDY CRAFT

- Weaving
- Basket making

INVESTMENTS

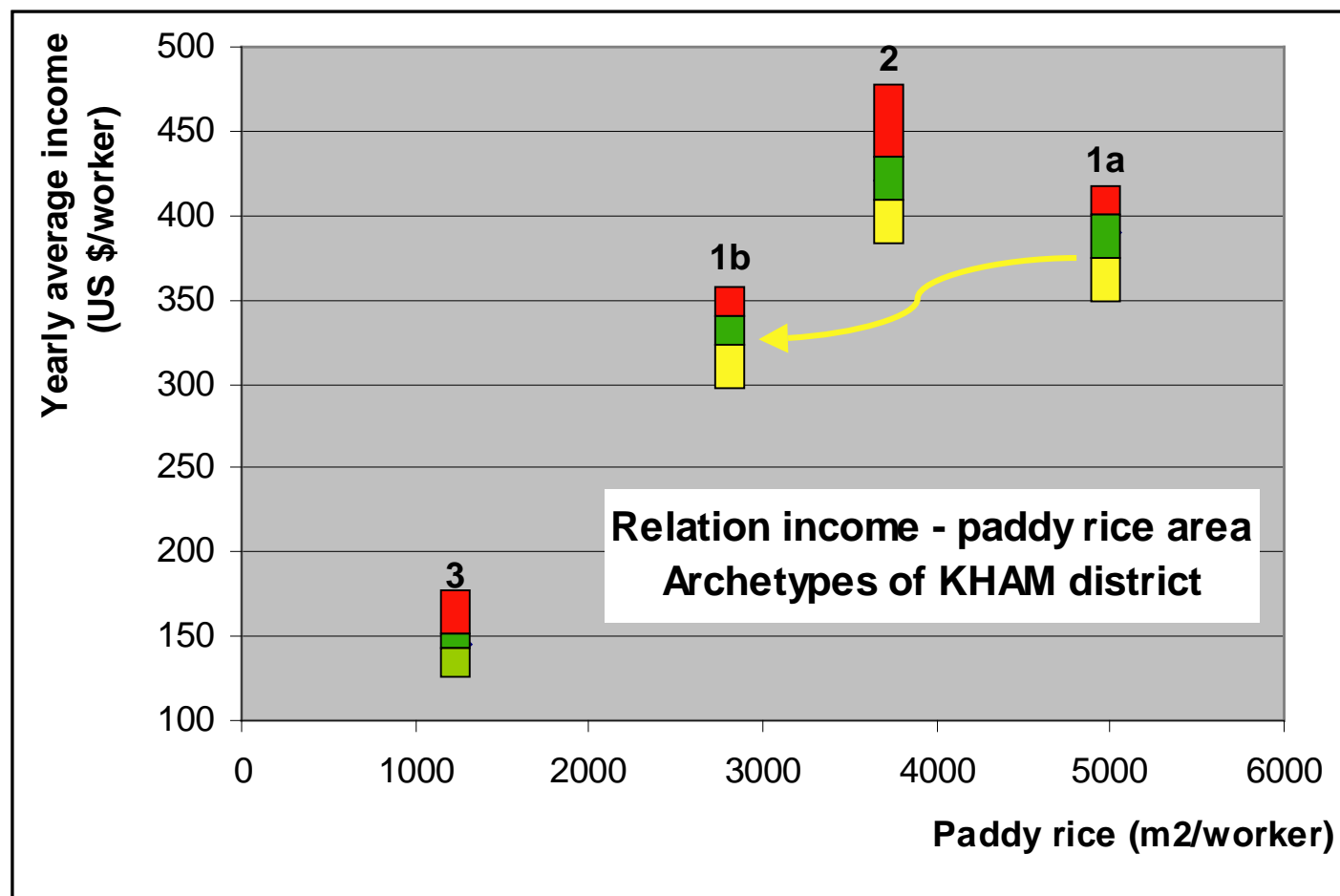
- **Hand tractor**
- Trailer for hand tractor
- **Small truck**
- Touk touk



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

Rice self-sufficiency
fulfilled

LOWLANDS
Type 1b



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

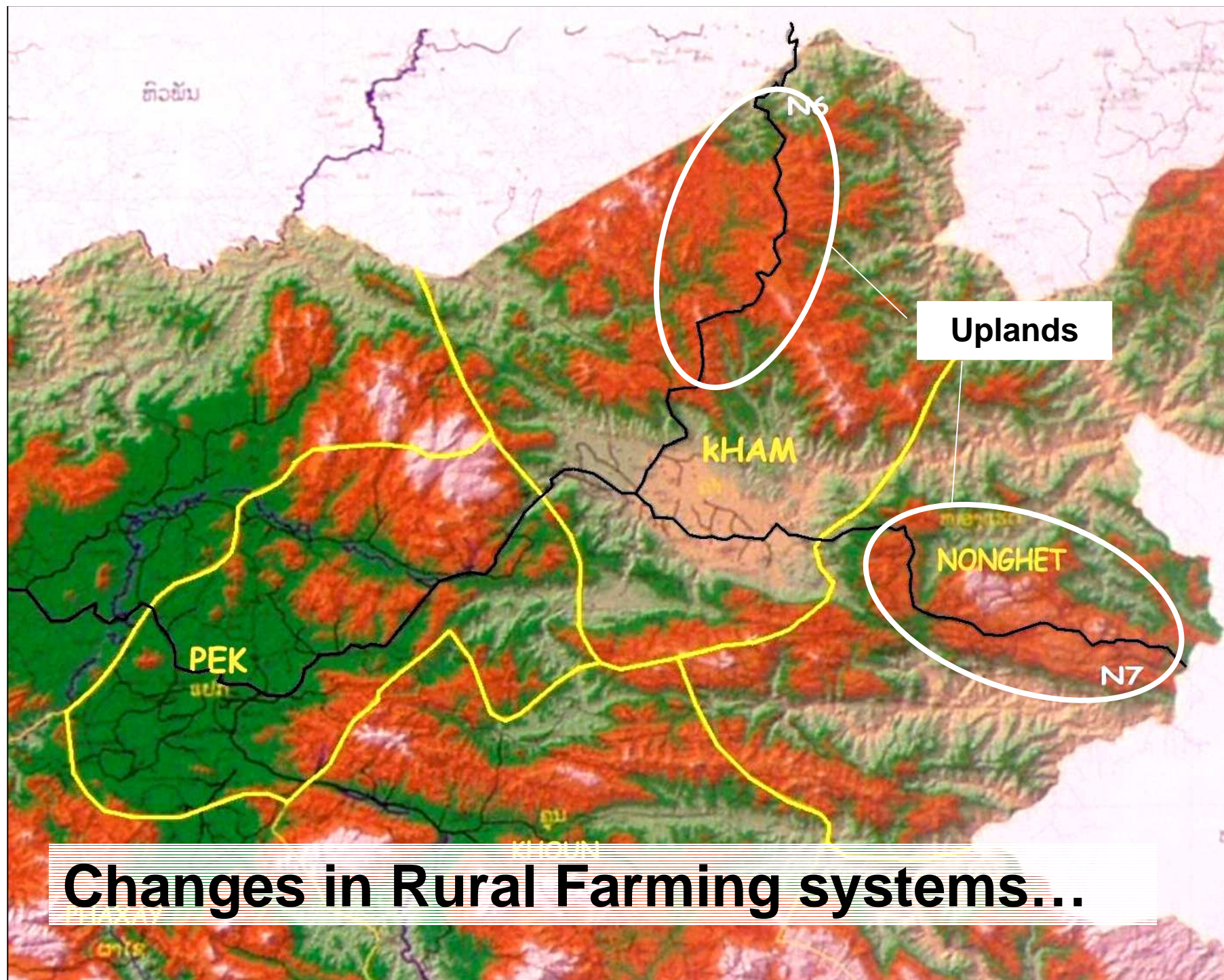
% of income coming from...

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

Main occurring changes...

- Increase cash crop activities: watermelon, garlic, chili, maize and bananas
- Increase of livestock activities



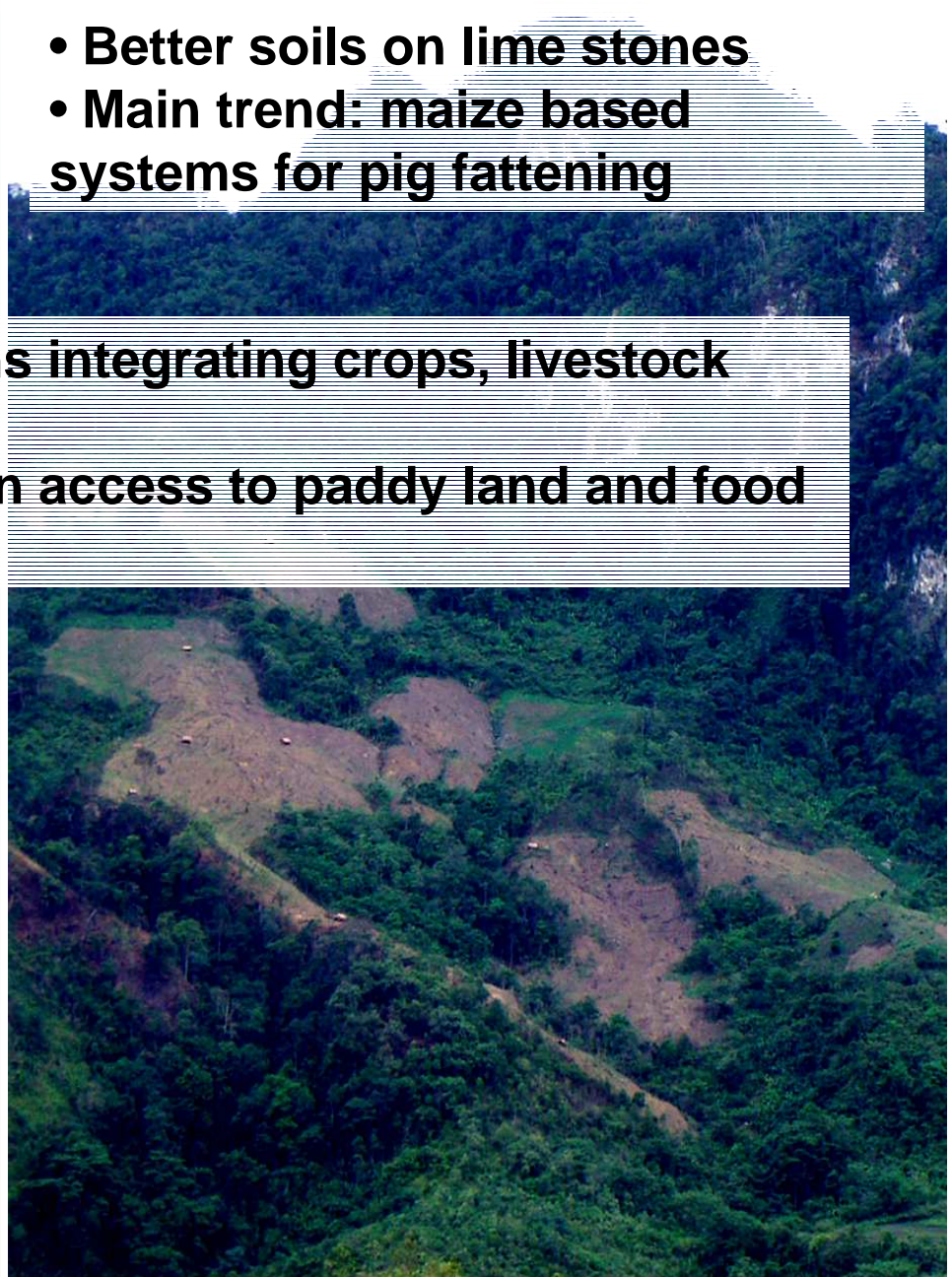


Uplands (1000-1300m): 2 ecological situations

- 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

HOUSEHOLDS CONSUMPTION

- Sewing machine

CROPS

- Rice in Paddy fields:
0,7-1 ha / household
1.400 to 1.600 m2/ worker
50-70% total surf. cultivated

CROPS

- Maize: 0,4-0,5 ha /fam.
- Chili pepper: 0,1-0,2 ha /fam.
- Manioc or Cana

HUNTING and GATHERING

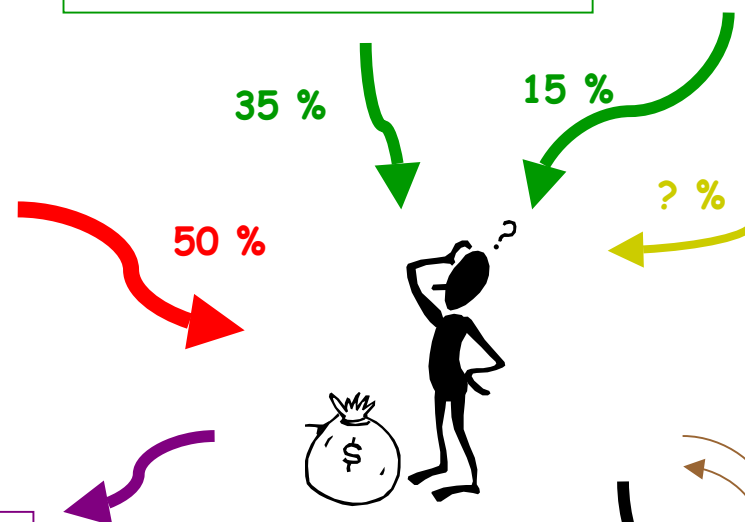
- Wood, Bamboo, bamboo shots, mushrooms, edible wild legumes, rattan, galangal, cardamom, broom flower etc.
- Hunting and fishing
- Metal collection

HANDY CRAFT

- Weaving
- Basket making

INVESTMENTS

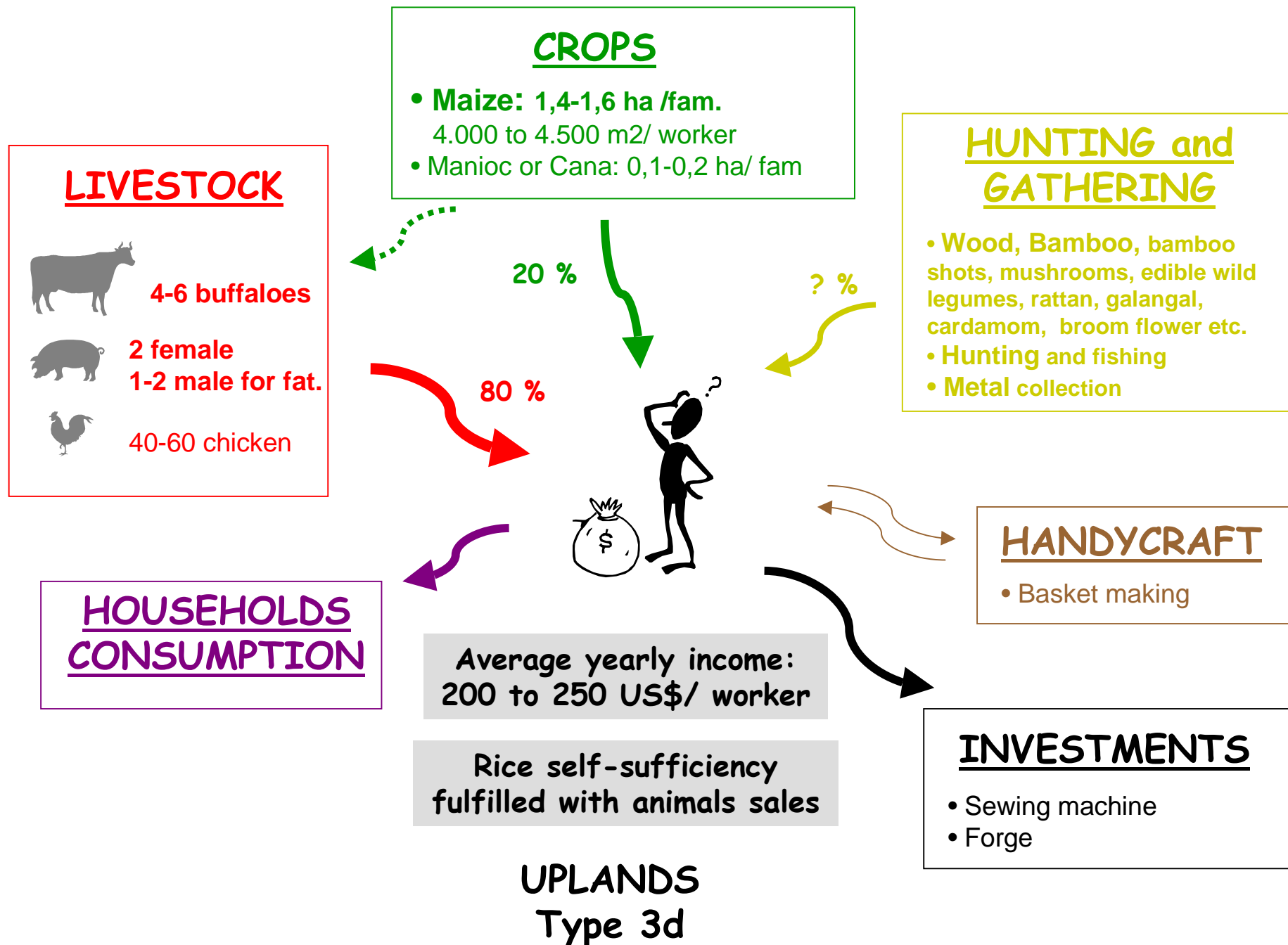
- Motorbike
- Small trucks

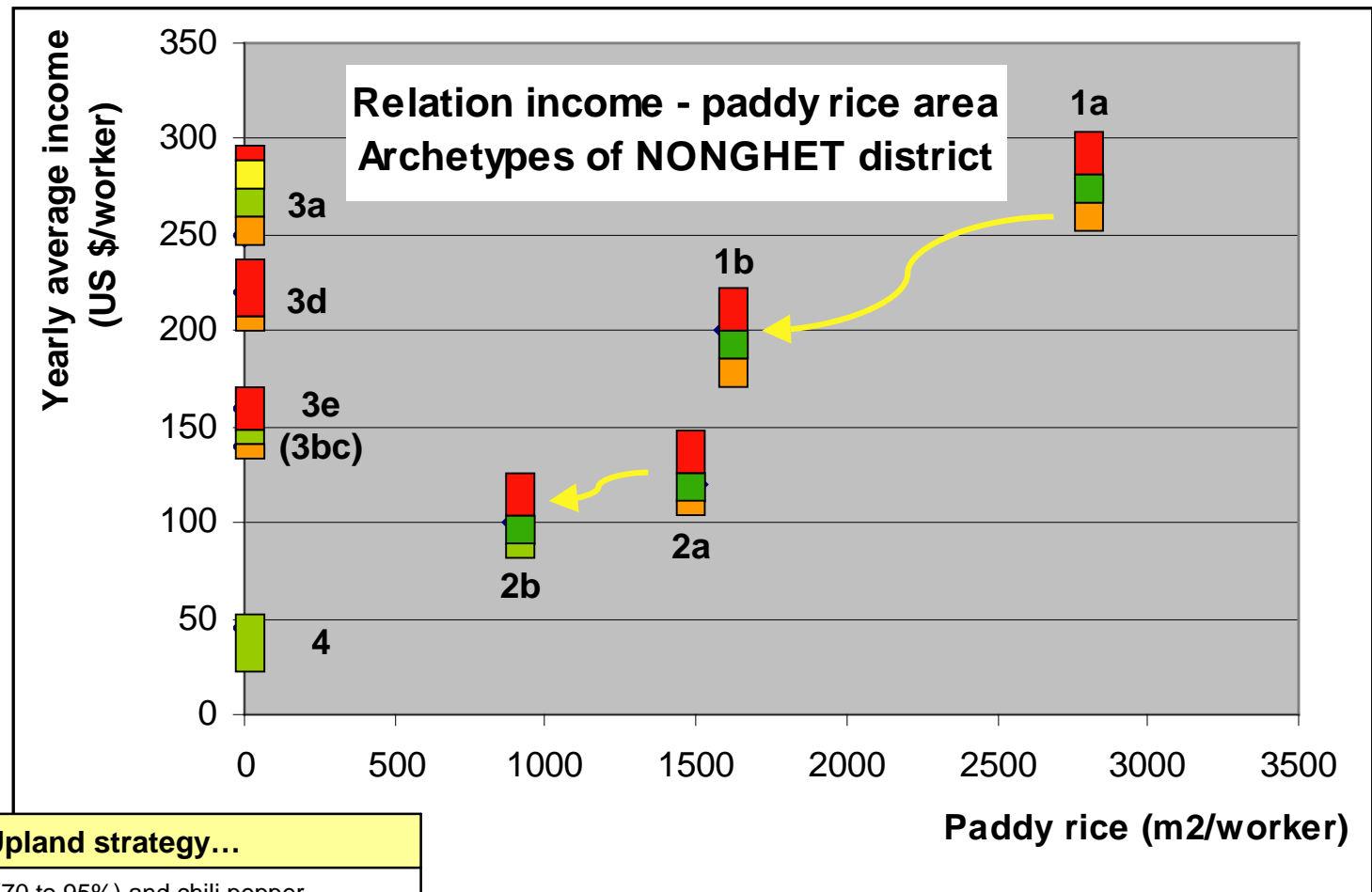


Average yearly income:
100 to 145 US\$/ worker

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

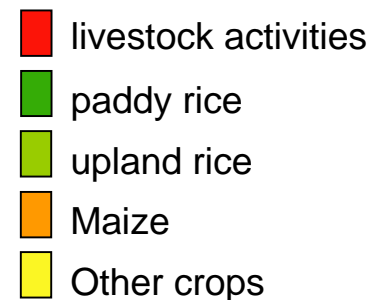
UPLANDS
Type 2a





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...



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.

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Thank you for your attention !

**Lao National Agro-ecology Programme
PO Box 2991, Vientiane, Lao PDR
pronaexk@laotel.com**