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*3rd International Conference on Public Health among Greater Mekong Sub-Regional Countries "Global Preventive Public Health Challenges among Greater Mekong Sub-Regional Countries" 9-10 August 2011, ITCT, Vientiane, Lao PDR*

# **Mothers and Children Nutritional Status and Food Habits in the City of Vientiane as Related to the Level of Urbanization**

**Eric Bénéfice IRD Laos**

*in collaboration with Phonethip Banouvong and Pierre  
Levi*



# Background

# Transitions

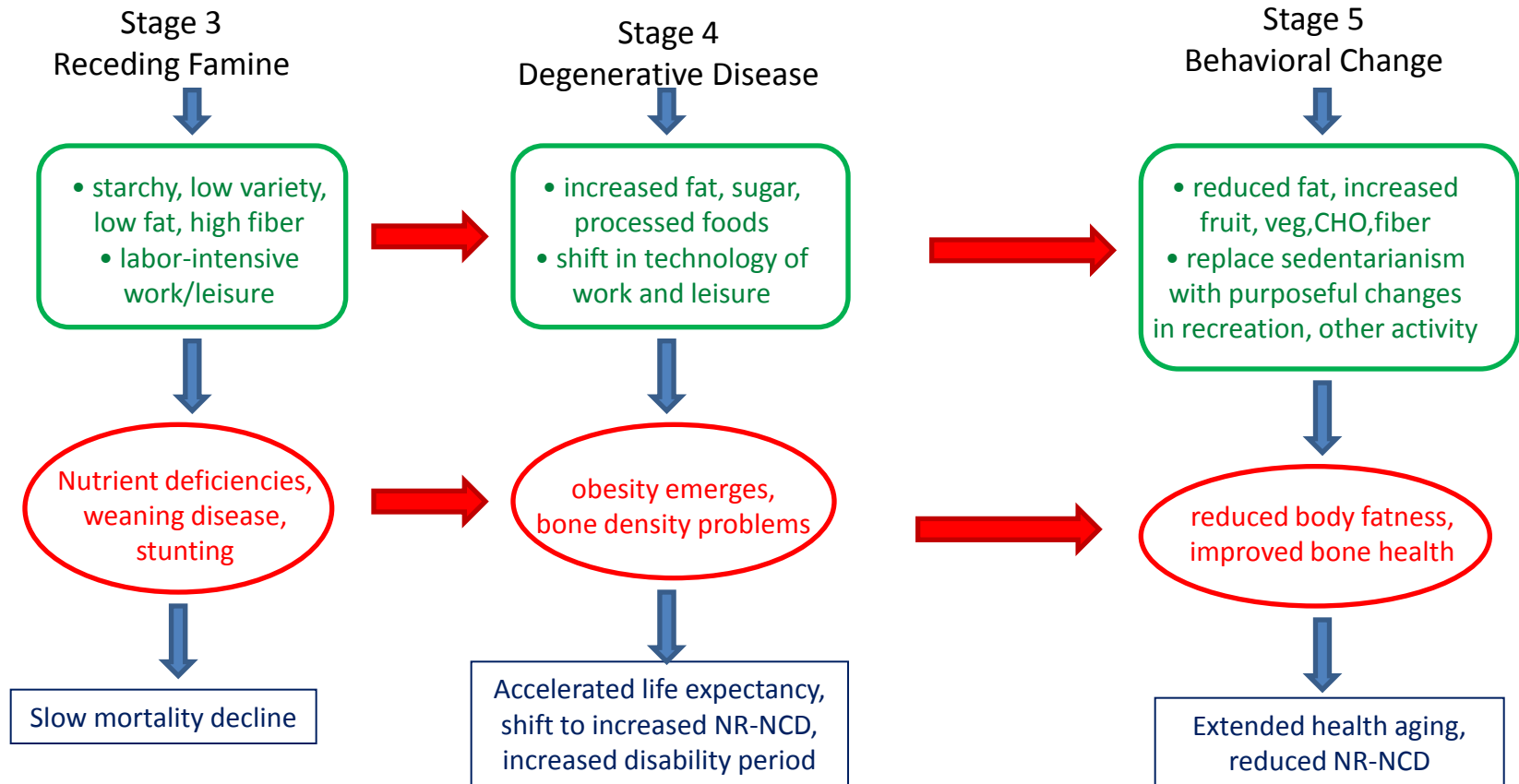
- **Demographic transition:** shift from high fertility and mortality to low fertility and mortality (Warren, 1929; Landry, 1982)
- **Epidemiological transition:** shift from a pattern of high prevalence of infectious and malnutrition, to one of high prevalence of chronic and degenerative disease associated with urban–industrial lifestyles (Omran, 1971)
- **Nutritional transition:** shifts on diet (refined food, low fiber content) and physical activity (lower levels) patterns (Popkin, 2004)

# Asia

- Asian countries are undergoing a rapid pace of urbanization, industrialization, technological changes that would impact their lifestyle
  - Global improvement of health status (better access to health facilities, better knowledge...)
  - Increase in non communicable diseases (CVD, diabetes, metabolic abnormalities, obesity...)
- Many studies from China, Pakistan, India, Philippines...)
- Thailand (Vongsvat Kosulwat, 2002)

# Mechanisms (*Popkin, 2004*)

## Urbanization, economic growth, technological changes for work, leisure, & food processing



# Transition in PDR Lao?

PDR Lao is not as urbanized as other SE Asian countries (ex Bangkok >10 million inhabitants vs Vientiane 300 000). But:

- Important economic growth (8 to 10% yearly)
- Infrastructures (roads, dams, bridges)
- Urban development (not only Vientiane)
- Improvement of medical facilities
- The part of agriculture in GNP tend to decrease



**Oct 2008**



**Oct 2008**



**Jul 2011**



**Jul 2011**



# Questions

- Are signs of a nutritional transition detectable in food eating pattern and nutritional status?
- Are they related to urbanization process?

# Methods

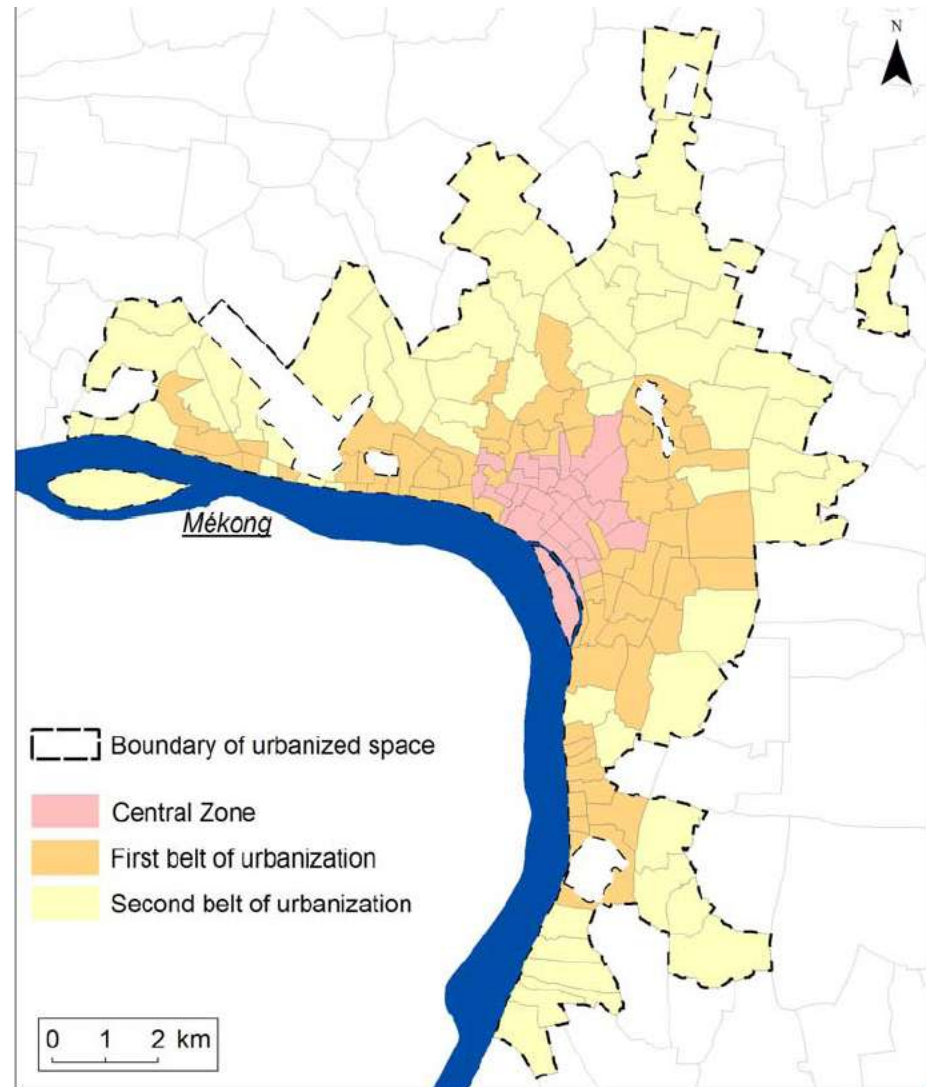
# Sampling

- Spatial disparities of Vientiane ( 189 villages, 4 urban and 3 periurban districts)
- Determination of “urbanization level” after 13 variables representing: density, equipment, accessibility; housing; activity... from the 1995 and 2005 census (*Vallee, 2008*)
- Selection of 148 urban villages (*Hierarchical classification analyze*)
- Determination of 3 urban spaces (*Correspondence analysis with a hierarchical forward design, Vallee, 2008*)

# Urban stratification

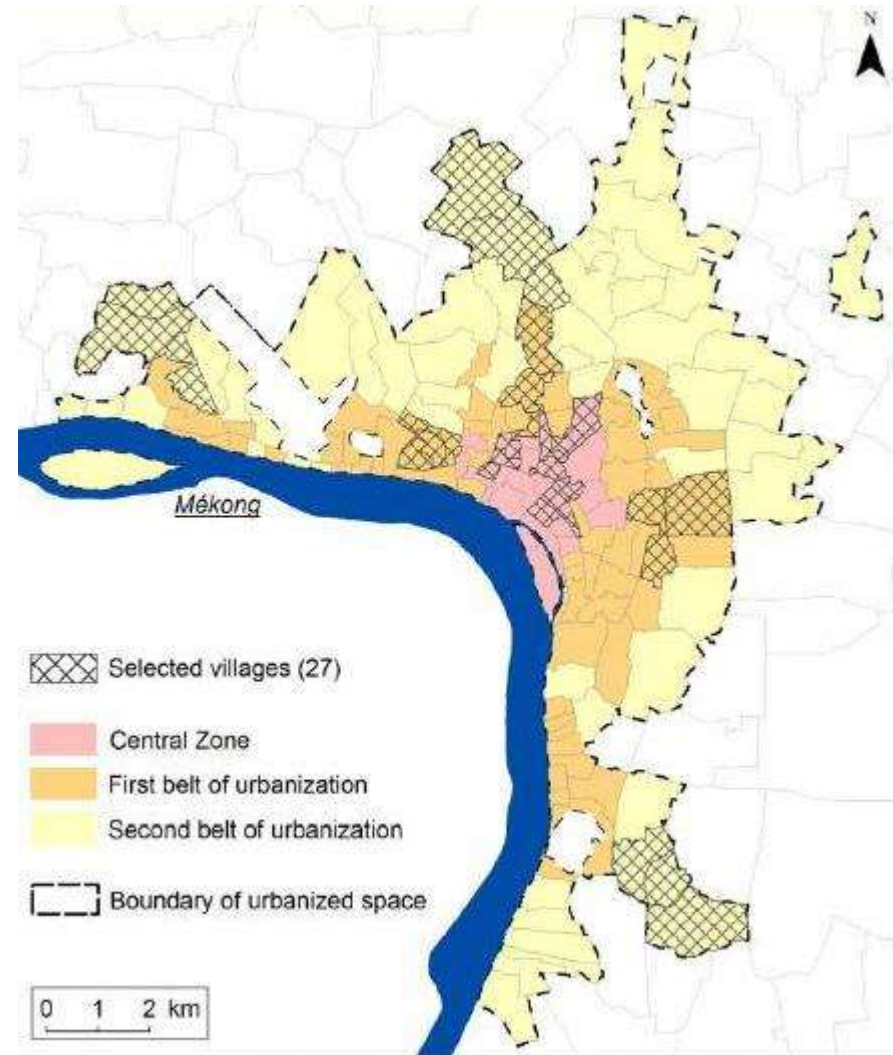
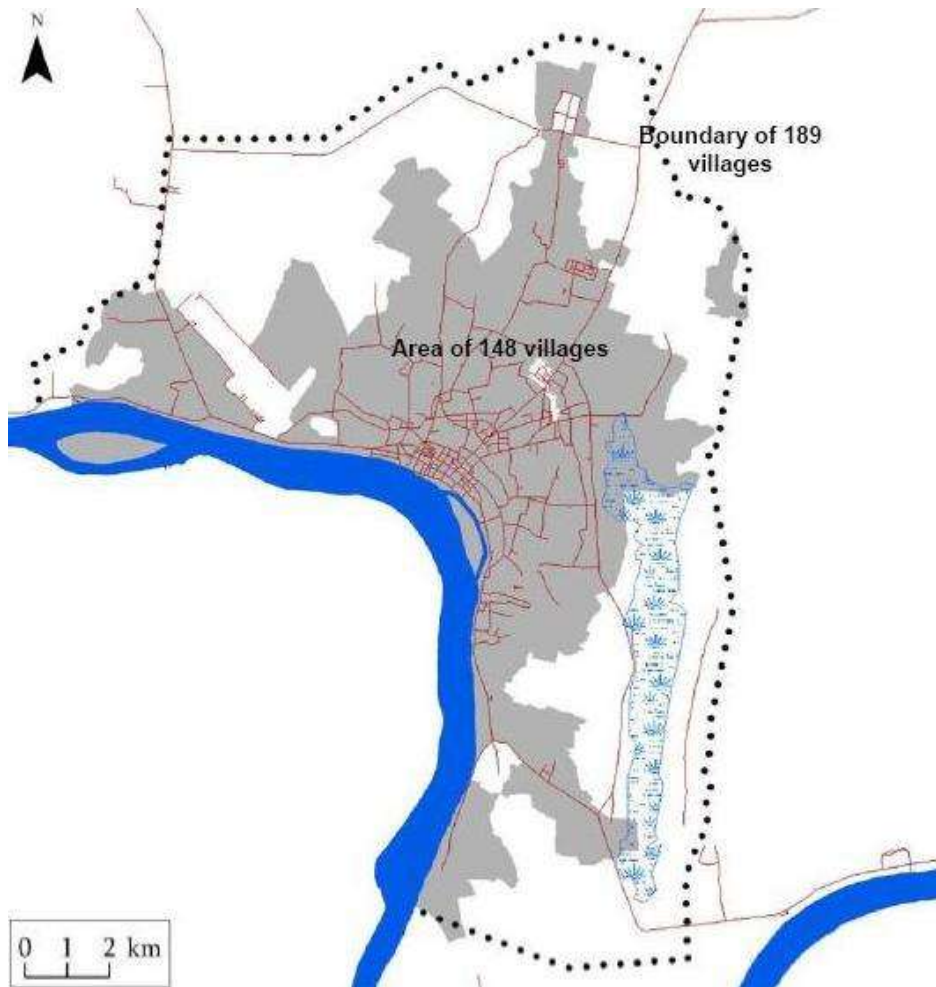
Division of 148 villages  
into 3 strata:

- Central zone: 25 villages
- First belt of urbanization: 67 villages
- Second belt: 56 villages



# Studied area and selected villages

(Vallee, 2008)



© Julie Vallée, IRD, 2006. Sources: Atlas Infographique de Vientiane, National Statistical Center

# Subjects and methods

- Sampling: youngest , pregnant or lactating women, from the whole sample: 157 mother-child pairs
- Repeated visits: 2007, 2008 and 2009; home to home surveys
- Food consumption survey (24 hours recall and frequency questionnaire)
- Anthropometry and clinical examination



# Food consumption

- Use of Nutrisurvey software ([www.nutrisurvey.de](http://www.nutrisurvey.de))
- Compilation of data from Thai, USDA, FAO, Canadian and German data base
- Survey file: 252 entries.
- More than 100 nutrients could be analyzed. In practice analysis of 23 nutrients and energy
- Food consumption scores



# Anthropometry

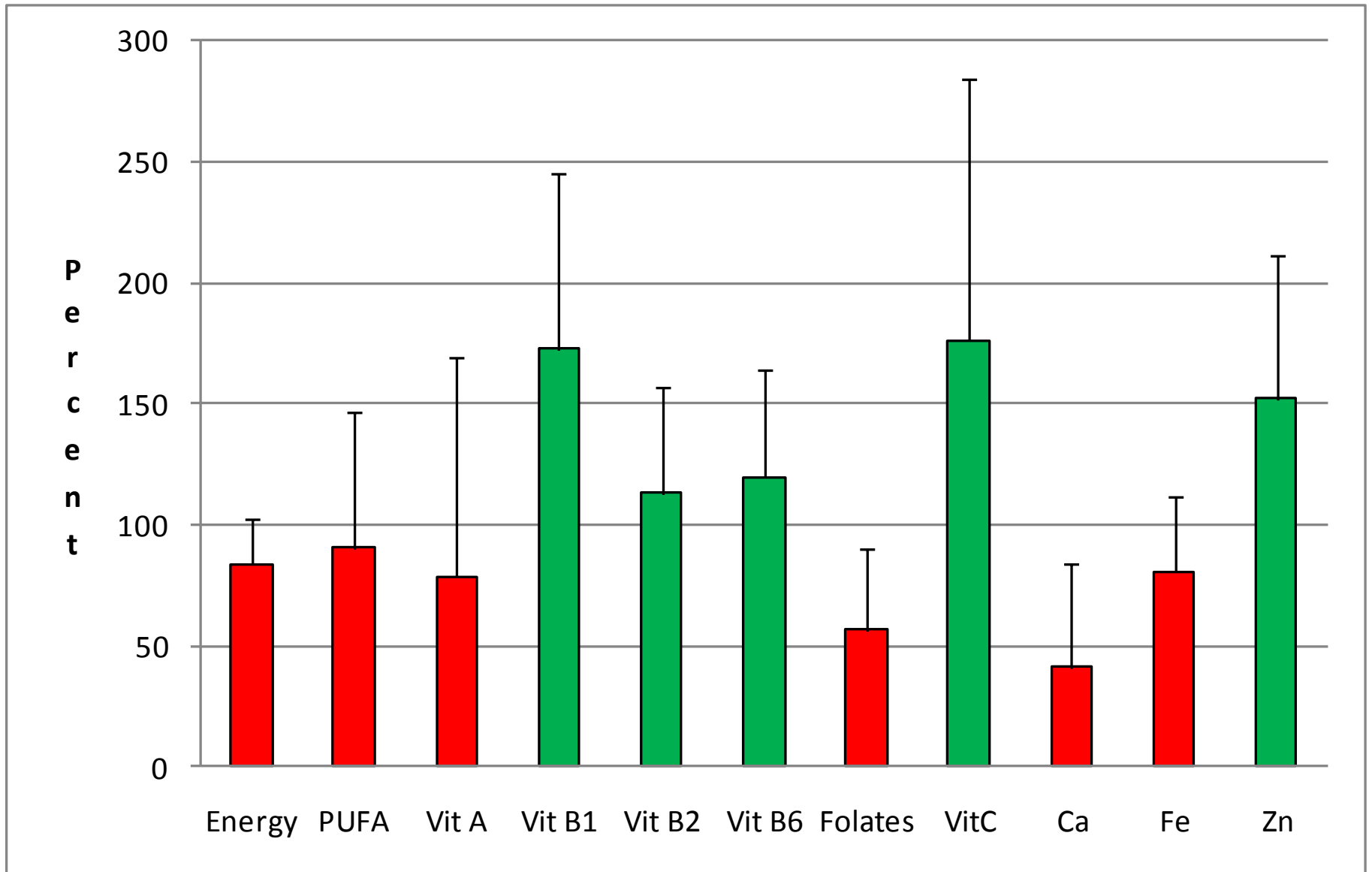
- Children: Weight, length (supine), head and arm circumferences, triceps skinfold
- Mother: weight, standing and sitting height, arm circumference, 4 skinfolds (tric, bic, sub scapul, iliac)





# Results

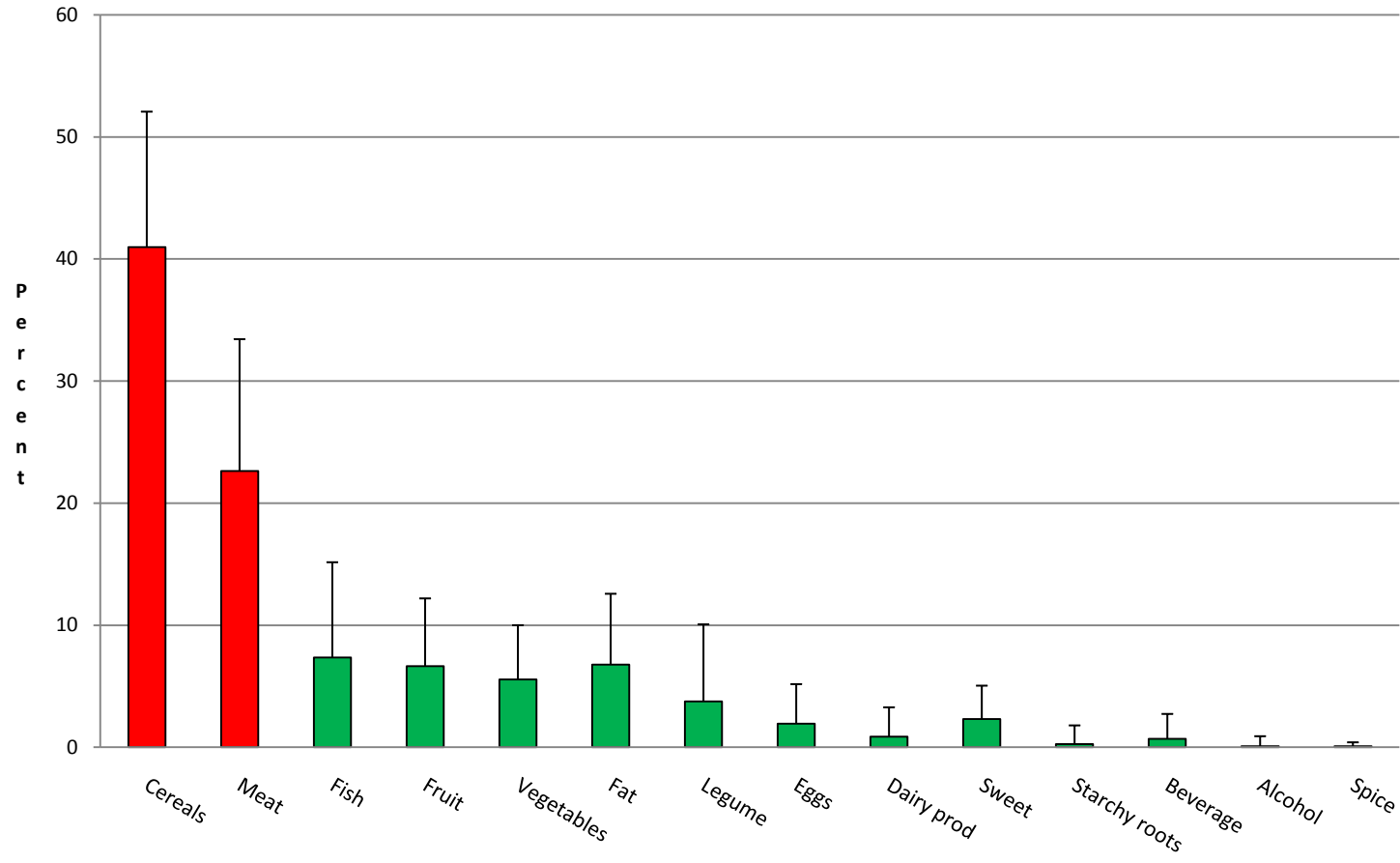
# Fulfillment of nutritional needs



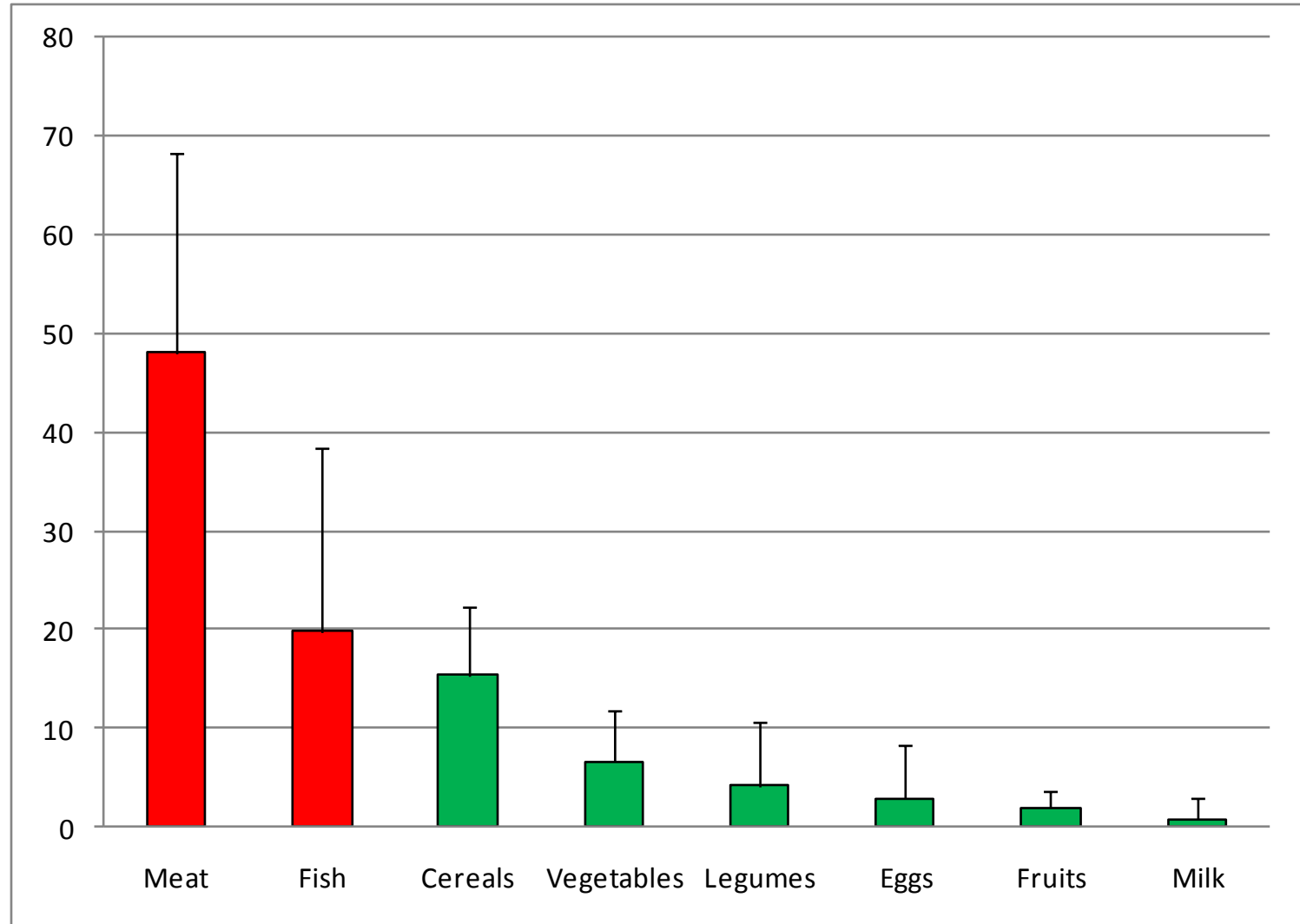
# Urbanization and intakes

- No quantitative differences according to urbanization
- But differences in the structure of the diet

# Contribution of food groups to energy content



# Contribution of food groups to protein content

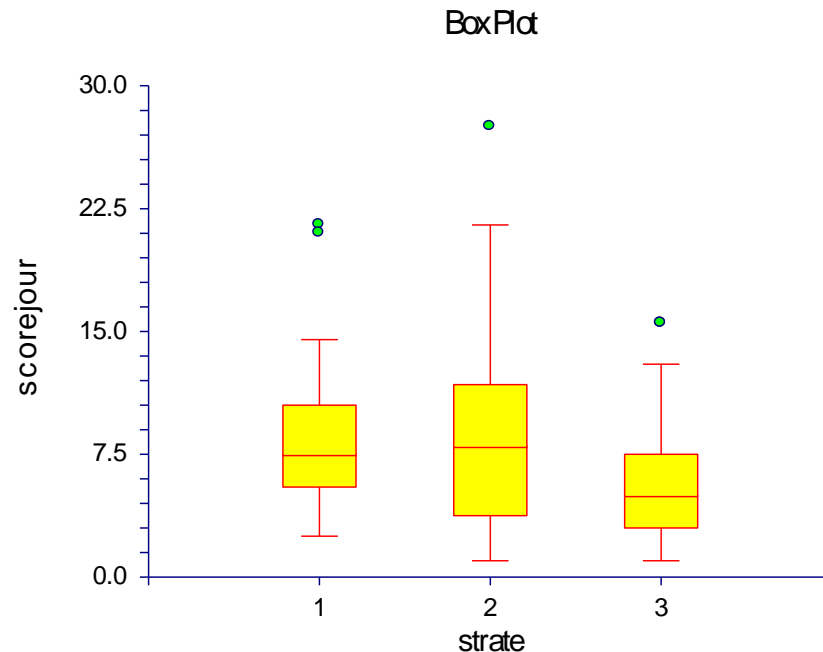


# Dietary habits and urbanization

- Significant differences in contribution of food groups to **energy content** (*General linear model of analysis of variance*):
  - Cereal:  $p < 0.06$  (area  $3 > 2 > 1$ )
  - Meat:  $p = 0.02$  (area  $1 > 2$  and  $3$ )
  - Fish:  $p = 0.03$  (area  $3 > 2 > 1$ )
- Contribution to **protein content**
  - Trend for meat:  $p = 0.06$  (area  $1 > 2 > 3$ )
  - Fish:  $p = 0.03$  (area  $3 > 2 > 1$ )
  - Cereals:  $p = 0.08$  (area  $3 > 2 > 1$ )

# Household dietary diversity

*Food consumption score elaborated by the WFP (Kennedy, 2010) base on 8 food groups*



Greater intake diversity in strata 1 and 2 than in strata 3  
( $p < 0.003$ )

# Nutritional status of under 3 yo children

- Overall:
  - Wasting 7.5% (95% CI: 4.7~11.3%)
  - Stunting 13.9% (95% CI: 10.0~18.6%)
  - Underweight 15.0% (95% CI: 11.0~19.8%)
- No effect of urbanization level on either wasting or stunting



# Linear growth determinants

- Multiple regression analysis with Height-age as dependent variable and a set of explaining variables:
  - Maternal variable(BMI, H, W)
  - Child variables (BW, age)
  - Categorical variables (urban strata, round)
- The model was pertinent and there were significant effects of
  - Child age
  - Birth weight
  - Women stature
  - And urbanization:  
***Belonging to strata 2 or 3 was negatively associated with linear growth***

# Mother status

- Differences in stature ( $p < 0.01$ ) and small trend body mass ( $p=0.06$ ) according to urbanization
  - Strata 2 > 1 and 3
- But corpulence (BMI) and adiposity (Skin folds) did not change

# Conclusions

# General

- Deficiencies in energy intakes and in nutrients (vit A, folates, calcium, iron) may exist
- Lesser stunting prevalence in the present sample than what is observed at the national level in urban areas (about 32% vs 13% here)
- But, similar prevalence of wasting (around 7%)

# Impact of urban development

- Food patterns may vary according to urban status
  - Greater consumption of fish and foods of plant origin in less urbanized areas than in the central part of Vientiane
  - Conversely, greater meat and dairy products consumption in more urbanized areas
- No effect of urbanization in nutritional indices but trend for a faster growth of children living in more urbanized areas
- No clear trends in case of mothers

# Commentaries

- A transition in food intakes pattern has been observed elsewhere in PDR Lao:
  - among “traditional ethnic groups” (Jutta Krahn, 2005)
  - At the national level (Kennedy et al, 2011)
- However, in Vientiane data for comparison purposes are lacking
  - Comparability and accuracy of food surveys is an issue

# Highlights: 4 points

1. The pace of nutritional transition is slower in PDR Lao compared with other Asian countries
2. Urban households still retained many positive traits of the traditional food habits: *importance of fish, vegetables, fruits consumption...*
3. Until now, the transition process is associated with an improvement in nutritional status
4. However, in certain segments of the population, situation could deteriorate quickly

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