

# Value chain analysis of NTFPs: case Laos

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# Outline

## 1. Background

- Defining Value chain, characteristics and types
- Defining NTFPs
- NTFPs in Laos and its contribution to livelihoods

## 2. Analyzing Value chain: field methods

- Sampling design (Snowball sampling)
- Focus group discussion (FGDs)
- Participatory mapping and transect walk
- Key informants interviews (KIIs)

## 3. Example of Value chain analysis from case study areas

# What is value chain?

**Value chain** concept came from business/economics (Porter 1985)

*“the full range of processes, activities, and flows required to bring a product or service from conception, through the different phases of production, distribution to consumers, and final disposal after use”*



Value created and captured - cost of creating value = Profit/Margin



# Why value chain analysis?

- to increase production efficiency so that a company or firm can deliver maximum value for the least possible cost.
- If a company can create efficiencies by analyzing one or more of the five primary value chain activities, it can gain a competitive advantage and increase profits



# Key elements for value chain analysis

1. Barriers to entry and economic rents
2. Governance
3. Types of value chain



## Barriers to entry

- *“an entry barrier is anything that hinders entry and has the effect of reducing or limiting competition” (www.oecd.org).*
- Higher level of barriers to entry ensures a high level of profitability. On the other hand, low barriers can create a highly competitive environment (Kaplinsky et al. 2002)



## Economic rents

- It arise due to differential productivity factors and barriers to entry.
- It is dynamic in nature and always erodes by the forces of competition.
- There are varieties of forms of economic rents, for instance, technological, human resource, organizational, marketing, relational, and so on (Kaplinsky et al. 2002).





# Governance

- It is the core concept to analyze a value chain and it is a non marketing economic coordination (Gereffi et al. 2001)
- It has four relevant elements:
  1. difference between the three functions of government; making the acts, implementing the acts and monitoring the acts
  2. in order to monitor these acts not only negative but also positive sanctions are required
  3. credible government is required to legitimate these acts in power
  4. power can be varied due to intensity, physical and economic situation (Kaplinsky and Morris 2000).





# Governance cont.

three forms of governance: legislative, judicial and executive.

- legislative governance - certain rules for suppliers to participate in the value chain
- judiciary governance - to check the performance of the supplier
- executive governance - assistance for the value chain actors to fulfil the standards



## Value Chain Types

- Two types: buyer-driven and producer-driven value chain.
- Buyer-driven chains driven by the buyers.
- Developing countries labour intensive industries are buyer driven
- Buyers from developed countries order goods with a certain quality from developing countries industries such as footwear, clothing, furniture and toys (Gereffi 199b)



- Producer-driven chains governed by the producers
- The leading role in whole marketing process is played by the larger manufacturing companies like automobile, computer, where capital, R&D, technology and manpower are very important (Gereffi 199b).



# Value chain innovation and upgrading

- It's an innovation process to add more value in the current product to gain competitive advantage (Kaplinsky and Morris 2000).
- Its done through product improvement and expansion in production and marketing strategies ([www.acdivoca.org](http://www.acdivoca.org)).



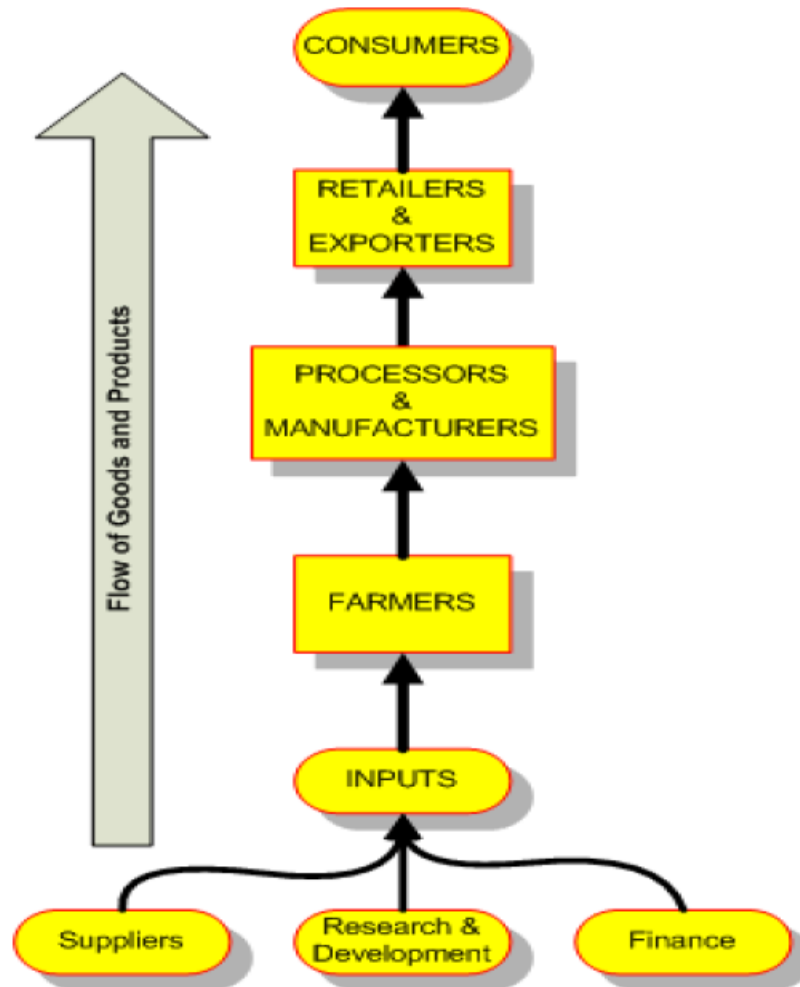
- four processes: business processing upgrade, product upgrade, chain function upgrade and chain-to-chain upgrade.
- In process upgrading the involved actors, take responsibility to uplift their internal working process to get a competitive advantage over others.



- In product upgrading actors try to launch a new product and improve the previous product in a rapid way to gain advantage over rivals.
- By changing the functional activities within the firm or increase the activities to different links in the chain.
- Chain upgrading is shifting from existing value chain to another chain to get more benefits (Kaplinsky and Morris 2000).

# Traditional marketing system

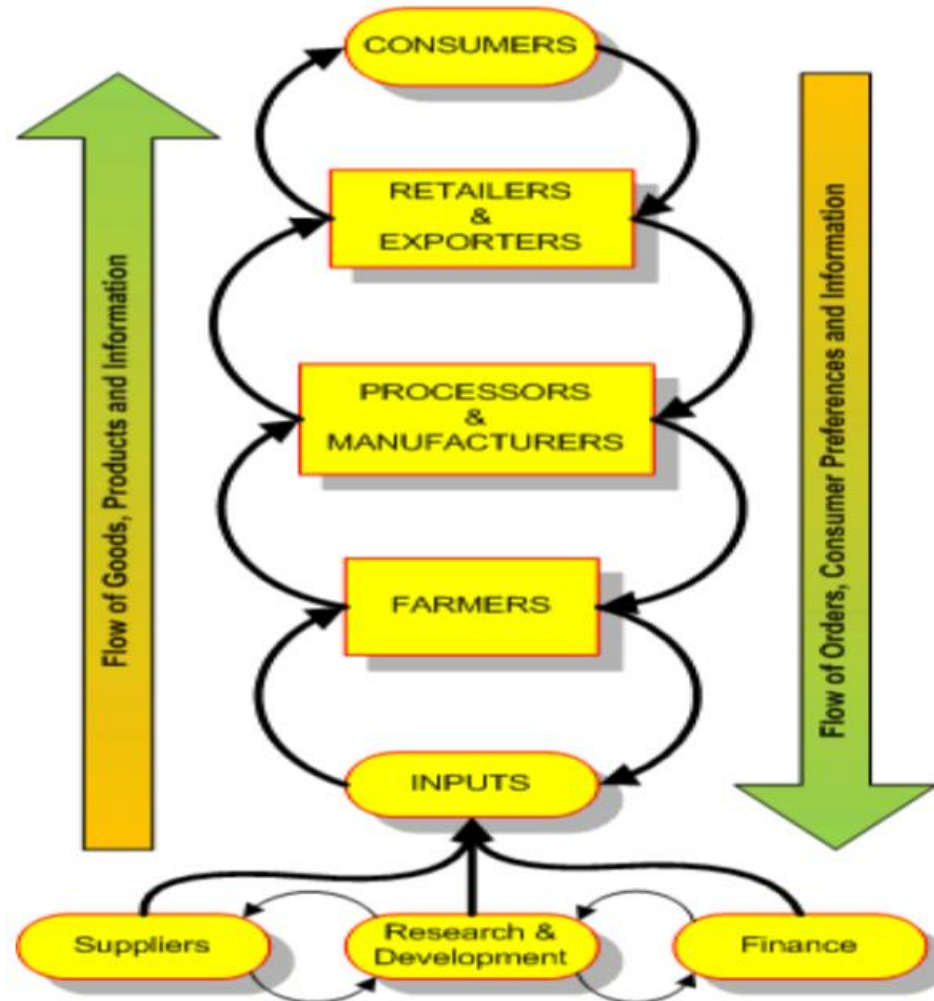
([www.researchintouse.com](http://www.researchintouse.com))





# Value chain marketing system model

([www.researchintouse.com](http://www.researchintouse.com))





# NTFPs definition

## *What is a Non-Timber Forest Product (NTFP)?*

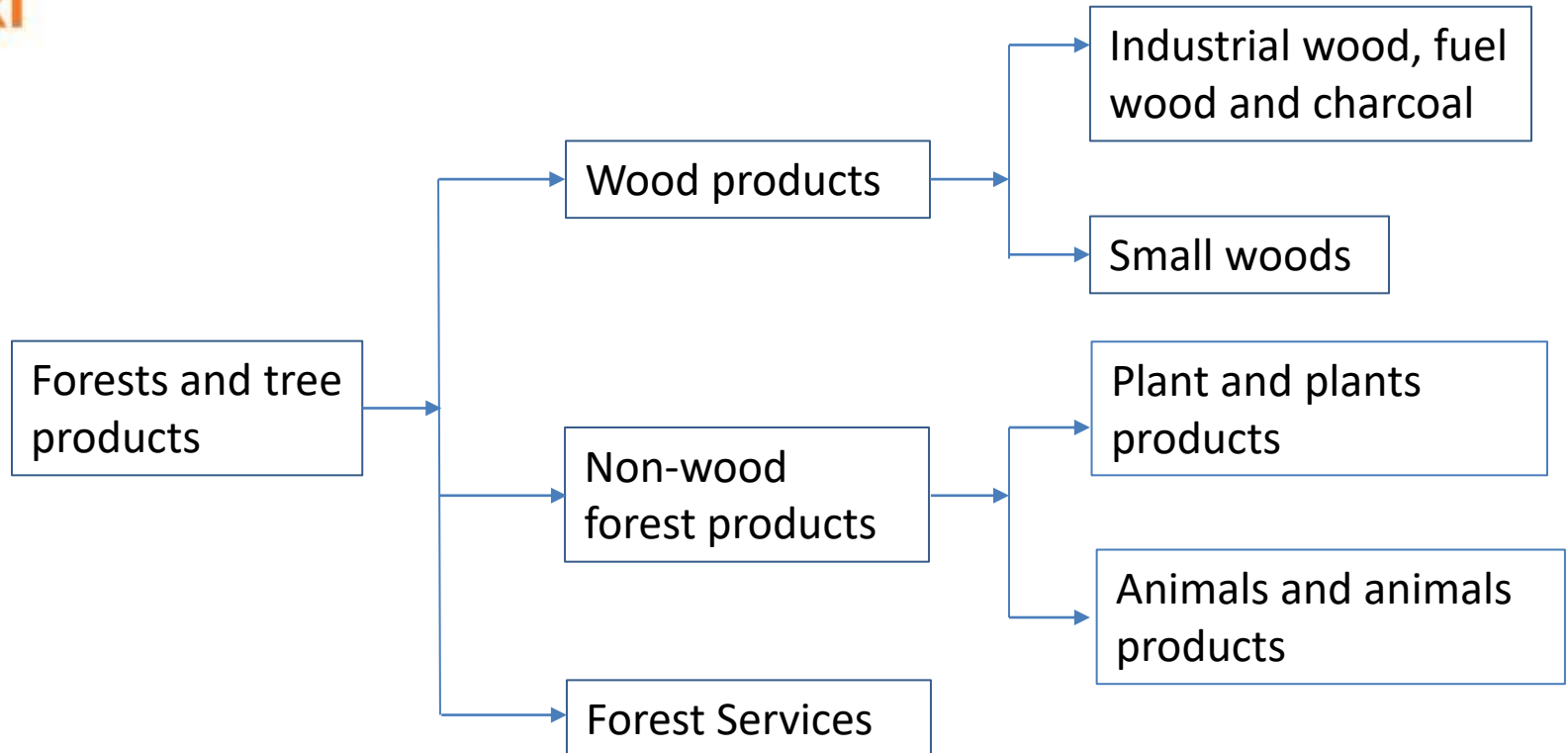
- Non-timber forest products (NTFPs) are any product or service other than timber that is produced in forests. They include fruits and nuts, vegetables, fish and game, medicinal plants, resins, essences and a range of barks and fibres such as bamboo, rattans, and a host of other palms and grasses.
- The term NTFP first used by De Beer, J.H. & McDermott, M.J. in 1989
- De Beer, J.H. & McDermott, M.J. defined NTFPs as *“Encompassing all biological materials other than timber, which are extracted from forests for human use”*
- It also called “Non wood forest products”, "byproducts of forests", "minor forest products", "non-wood goods and benefits", "non-wood goods and services", "other forest products", "secondary forest products", "special forest products“.



## Definition by FAO

- FAO defines NWFP as being *“goods of biological origin other than wood derived from forests, other wooded land and trees outside forests”* (FAO, 1999).
- NWFP excludes all woody raw materials. Therefore, timber, chips, charcoal and fuelwood, as well as small woods such as tools, household equipment and carvings, are not included.
- Whereas, NTFPs include fuelwood and small woods

## Classification of forest and tree products (adopted from FAO)



## NTFPs definition in Laos

- NTFPs include all the materials (excluding timber extraction) collected from forest, or manmade forest and riverine habitats that are used to support local livelihoods. This includes items such as forest and aquatic vegetables, fruit, traditional medicine products, wild animals and aquatic organisms such as fish, mollusks, insects and crustaceans. While the term NTFP implies non-timber items, it does include wood products for home construction, fuelwood and charcoal and handicraft products. NTFPs can be even non-organic items like scrap metal from bombs and airplanes (Mollot et al. 2004)





## Importance of NTFPs

- Several million households around the dependent heavily on NTFPs for subsistence and/or income, health and nutritional needs and industrial processing.
- At least 150 NTFPs have significant value in international trade i.e. honey, gum arabic, rattan, bamboo, cork, nuts, mushrooms, resins, essential oils, and plant and animal parts for pharmaceutical products.
- NTFPs also contribute to environmental objectives, including the conservation of biological diversity.

# NTFPs in Laos







## General info

- Lao PDR is rich in forests and has diverse flora and fauna, 757 plants and 150 animals have been identified as NTFPs
- About 80% of the people, especially in rural areas for forest products (NAFRI, 2007)
- Annual domestic trading value of NTFPs in Laos is about 23-24 million US\$/year, while foreign export value is roughly 6-7 million US\$/year, which is about 2% of total export volume (Foppes and Kethphanh, 1997)
- Only Cardamom (*Amomum* sp.) and malva nuts (*Scaphium macropodum*) contribute 60-70% of the total NTFPs export value

- China, Thailand and Vietnam are the main exporting countries of NTFPs from Laos. For more information:  
<http://www.fao.org/forestry/nwfp/78836/en/laos/>
- Only log production alone contributed 3.2% in country's GDP, while contribution of NTFPs is remain unknown (MAF 2005)
- NTFPs are providing in average 320 US\$ per family per year in rural areas (NAFRI 2007)



Pic: Laos's NTFPs product flow



## NTFPs position in Laos Forest Law

- Forest law approved in 1996 and revised in 2005
- Villagers access and customary rights on NTFPs have recognized in Forest law
- PAFO and DAFO are responsible to look after the rights of the villagers in using NTFPs rights
- Laos's government has a target to uplift the forest coverage to 70% in 2020 and NTFPs is one of the key programmes



## Major types of NTFPs in Laos (NAFRI, 2007)

1. Food	2. Medicine
<p>Fruit: <i>Baccaurea ramiflora</i> Stems/shoots: Bamboo and rattan shoots Tubers/roots: <i>Dioscorea hispida</i> Leaves: <i>Melientha suavis</i> Nuts/seeds: <i>Arenga westerhoutii</i> Flowers: <i>Markhamia stipulata</i> Spices: <i>Zanthoxylum rhetsa</i> Mushrooms: <i>Lentinus</i> sp. Food oils and gums: <i>Apium graveolens</i> Fodder (for animals): <i>Albizia procera</i></p>	<p>Fruit: <i>Rhus chinensis</i> Stems/shoots: <i>Coscinium fenestratum</i> Tubers/roots: <i>Smilax grabra</i> Leaves: <i>Plumbago indica</i> Nuts/seeds: <i>Strychnox nux vomica</i> Flowers: <i>Clerodendrum paniculatum</i> Bark: <i>Clausena harmandiana</i> Wood: <i>Draceana loureiri</i></p>



3. Fibres	4. Extracts
Leaf: <i>Pandanus</i> sp. Stem: Bamboo or rattans Bark: <i>Broussonetia papyrifera</i> Grass: <i>Thysanolaena latifolia</i>	Gums: <i>Boehmeria malabarica</i> Gum resin: <i>Garcinia</i> sp. Resin: <i>Shorea obtusa</i> Oleoresin: <i>Dipterocarpus alatus</i> Latex: <i>Swietenia macrophylla</i> Tannin: <i>Pentace burmanica</i> Dye: <i>Diospyros mollis</i> Essential oil: <i>Aquilaria</i> sp. Stimulants: Betel nut Insecticides: <i>Azadirachta indica</i>
5. Ornamentals	5. Charcoal and fuel wood
Orchids, Ferns and curcuma flowers	6. Animal products



## NTFPs as food source in Laos

- NTFPs contribution to rural family diet is equivalent to 280 US\$ (world bank, 2005)
- After glutinous rice, forest foods are common in daily meal
- More than 700 types of forest species are available in Laos as food source
- Forest foods are important during natural hazards and its use also varies according to seasons.

## Forest foods types (Foppes and Kethphanh , 2004b)

Category	No. of products	Examples
Fruits, seeds	87	Sugar palm fruits, Baccaurea berries, Irvingia nuts
Leaves	86	Barringtonia, Lasia, Azadirachta, Centella
Shoots	23	Bamboo shoots, rattan shoots, palm hearts
Tubers, roots	22	Yam tubers (Dioscorea), galangal roots
Mushrooms	16	Ear mushrooms, shii-take, termite mushrooms
Flowers	4	Sesbania, Butea, Markhamia



## Forest foods types (Foppes and Kethphanh , 2004b)

Category	No. of products	Examples
Fish	300	Cyprinidae, pangasiidae, siluridae, notopteridae
Birds	63	Doves, partridges, pheasants, bulbuls, estrildas
Mammals	54	Squirrels, wild boar, rats, civet cats, mouse deer
Reptiles, amphibians	41	Frogs, monitor lizards, snakes, turtles
Molluscs	7	Freshwater shrimps, crabs, snails, shells Freshwater shrimps, crabs, snails, shells
Insects	5	Red and eggs, bamboo grubs, dung beetles



## Nutrient availability in forest foods (Clendon, 2001)

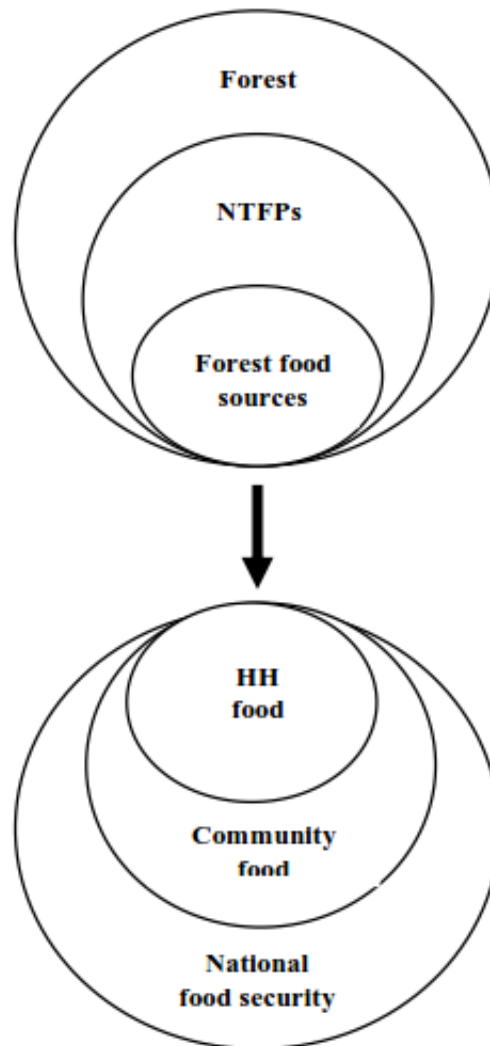
Foods	Energy	Micronutrients	Minerals
Forest animals, birds	High in fat, complete protein Offal/organs	high in nutrients, Vitamin B	Animal iron
Fish, crustaceans, frogs, molluscs	Complete protein	Some vitamin B	Animal iron, calcium from small fish (bones)
Insects, larvae, insect eggs	High in fat, high in protein	Vitamin A, caterpillars rich in vitamin B12	Animal iron
Mushrooms	High in carbohydrate, rich in protein	Small amount of vitamin A and C depending on species	Most species low in iron
Bamboo	High in fibre and carbohydrate, rich in vegetable protein	Mineral amounts, lost in cooking	



## Nutrient availability in forest foods (Clendon, 2001)

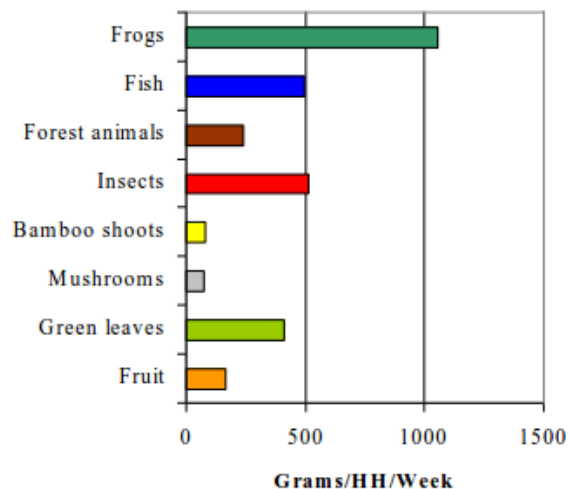
Foods	Energy	Micronutrients	Minerals
Plants – leaves, stems, flowers	Low in energy, source of soluble fibre	Leaves important for vitamin A, C and folic acid. The darker the leaf, the more A and C	Vegetable iron from dark greens
Tubers	Rich in starch		
Honey	High in energy, rich source of simple sugars	Vitamin A	
Nuts	Carbohydrate, oils, protein		
Fruits, berries	Sugars and soluble fibre	Important source of vitamin A and C	Calcium, Magnesium, Potassium

## Contribution of forest foods to the lao food system (Clendon, 2001)



# NTFPs harvesting and valuation (Clendon, 2001)

## Dry Season



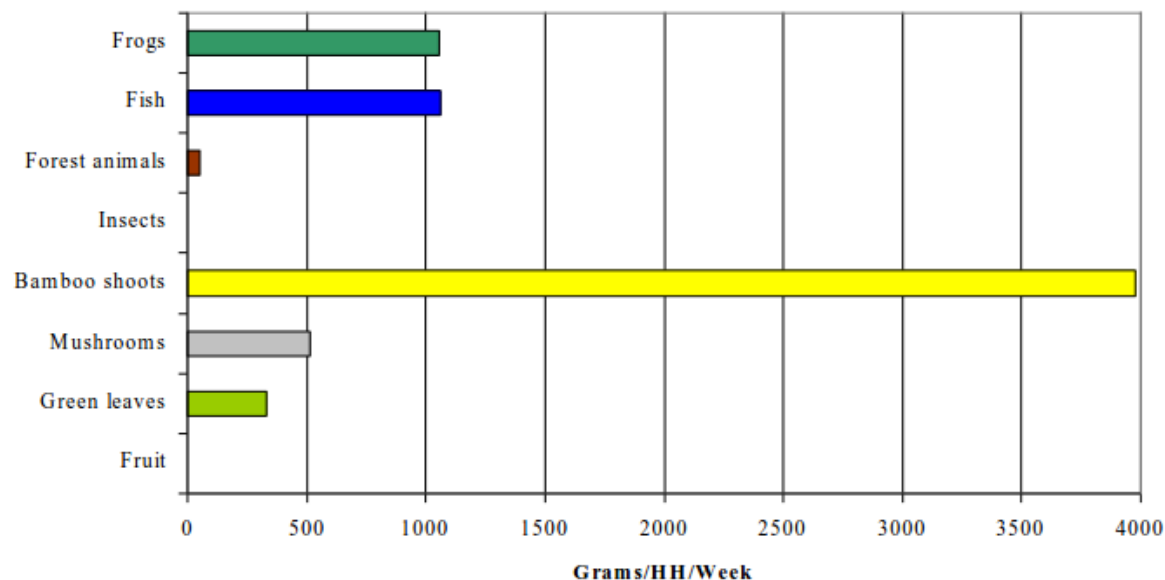
## Resource values (av/HH/week)

Resource	Dry		Rainy	
	Kip	%	Kip	%
Frogs	2,123	40	3,034	30
Fish	1,050	20	2,417	24
Forest animals	411	8	133	1
Insects	561	11	0	0
Bb shoots	33	1	3,094	30
Mushrooms	83	2	739	7
Green leaves	589	11	861	8
Fruit	471	9	0	0
<b>Total</b>	<b>5,322</b>	<b>100</b>	<b>10,278</b>	<b>100</b>

\$1 = Kip 2,500

\$1 = Kip 3,850

## Rainy Season





## Seasonal calendar for forest food resources (Clendon, 2001)

Resources	Months												Harvested by			
	1	2	3	4	5	6	7	8	9	10	11	12	M	W	B	G
<b>Water animals</b>																
Frogs (khiat)																
Crabs																
Big toads																
Fa																
Toads																
Frogs (kop)																
Fish																
Shrimps																
Snails																
Eels																
<b>Forest animals</b>																
Snakes																
Nyeh																
Rats																
Squirrels																
Turtle																
Lizard																
Len																
Gathang																
<b>Insects</b>																
Red ant eggs																
Chachan																
Honey/larvae																
Chilo																
<b>Plants</b>																
Pak eleh																
Bon																
Low																
Pak naam																
Pak kaden																
Pak tiew																
Pak wan																
Dohk gachio																
Mak chong																
Mango																
Mushrooms																
Bamboo shoots																
Tow																
Pak samek																

M = Men; W = Women; B = Boys; G = Girls

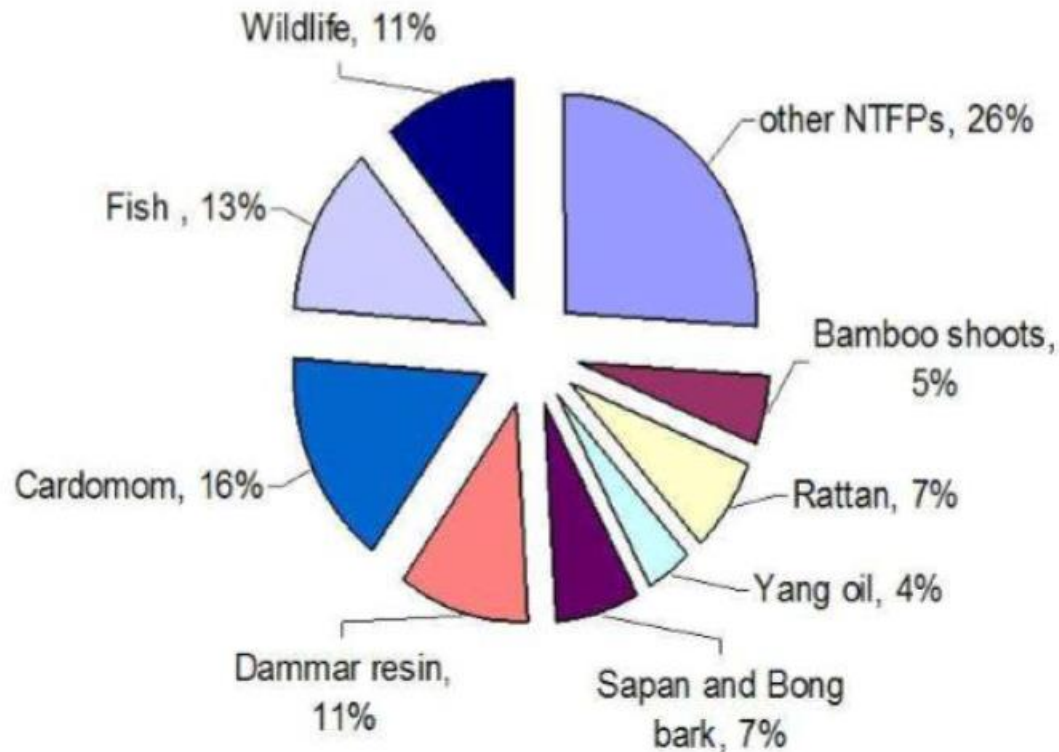


## Economic contribution of NTFPs

- Economic contributions of NTFPs in rural households are difficult to estimate
- Only 16%-25% of NTFPs provide direct cash income to the household (Foppes and Kethphanh 2004a)
- About 55% of household cash income comes from NTFPs collection and trade (IUCN 2006)
- Annual contribution of NTFPs at the national level about 232,000 US\$ (MAF, 2005)



## Household income from NTFPs (IUCN, 2006)





## NTFPs in biodiversity conservation

- Laos is extraordinarily rich in biodiversity due to its low population density, ecosystems variety and less degraded forest areas than other neighbouring countries
- Out of 10 million ha of natural forests, around 3 million ha area are converted into National Biodiversity Conservation Areas (NBCAs) (MAF, 1999)
- NTFPs has a crucial role to biodiversity conservation and govt. has put some restriction on harvesting of NTFPs

# NTFPs value chain research

Research interests	Entry point	What to map	Examples
The global distribution of income	The final consumers	Backwards down the chain to retailers, buyers, producers	In furniture: groups of customers of department and specialist stores, i.e IKEA
Gender, age and ethnicity	Female labour	Use of female labour throughout value chain	In clothing, women in cotton farms, factories, export agents, design houses, advertising agencies, retail stores

# NTFPs value chain research

Research interests	Entry point	What to map	Examples
Agricultural producers	Farms	Forwards to processors, buyers and their customers, backwards to input suppliers	Fresh vegetables to salad packers and category buyers in final markets
Role of retailers	Supermarkets or retail chains	Forwards to type of customer, backwards through buyers, producers and their suppliers	supermarkets

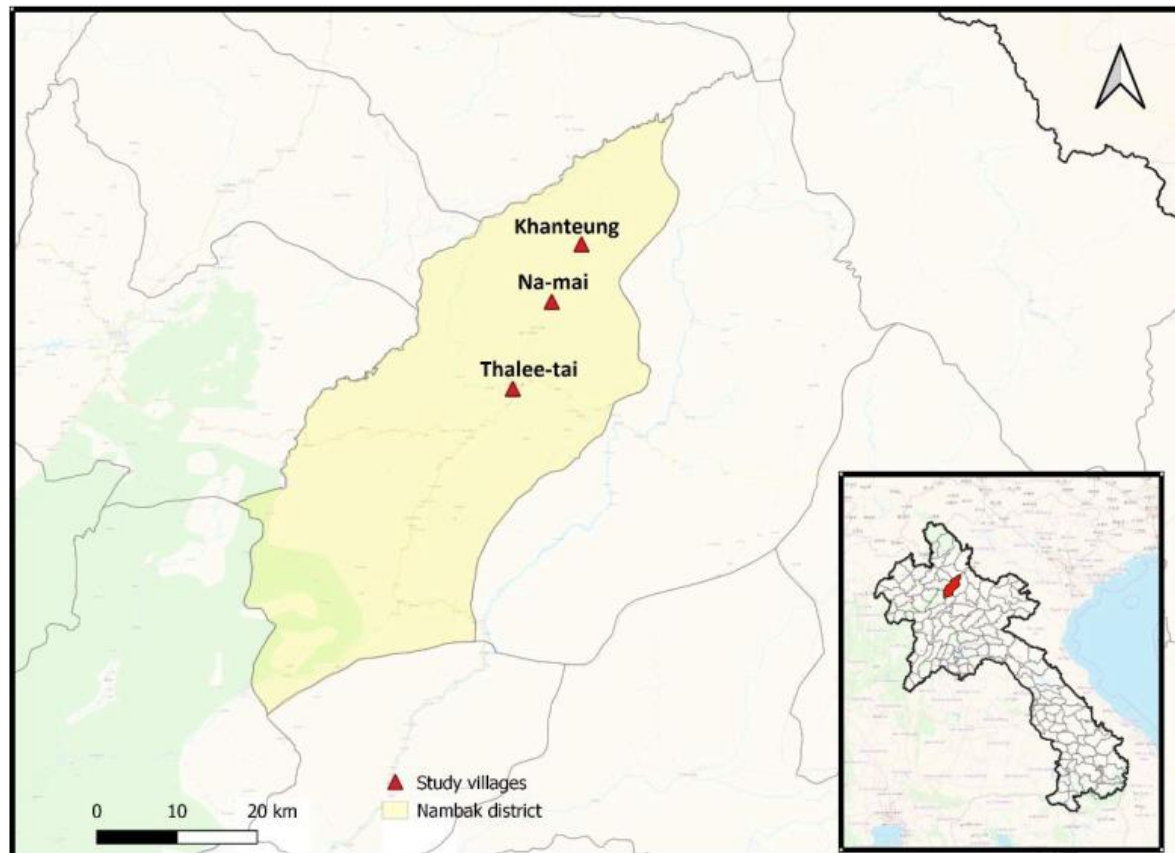


# Data collection methods

## Study area selection

1. Market distance from areas by using remoteness gradients
2. Areas with different types of forests
3. Normal agriculture and traditional fuel wood use
4. A village close to forest plantation and a village without any plantations
5. Village influenced by dams and rivers

## Example: Map of study area





## Focus group discussion (FGDs)



A focus group is best defined as a small group of carefully selected participants who contribute to open discussions about a particular topic!





## Why FGDs?

- to gather people's opinions, ideas, and beliefs on a certain topic or product
- to gather more information in a shorter period (i.e. 2 hours)
- when there are power differences between the participants and decision-makers or professionals
- when there is little or no knowledge about the target market



# Characteristics of FGDs

- Groups are small (8-12)
- The selected members may need to be homogeneous.
- Neutral Facilitator
- The physical appearance needs to be informal and relax environment
- The time duration may be 1 ½ to 2 hours
- Responses are recorded in detail
- Questions are pre-formulated

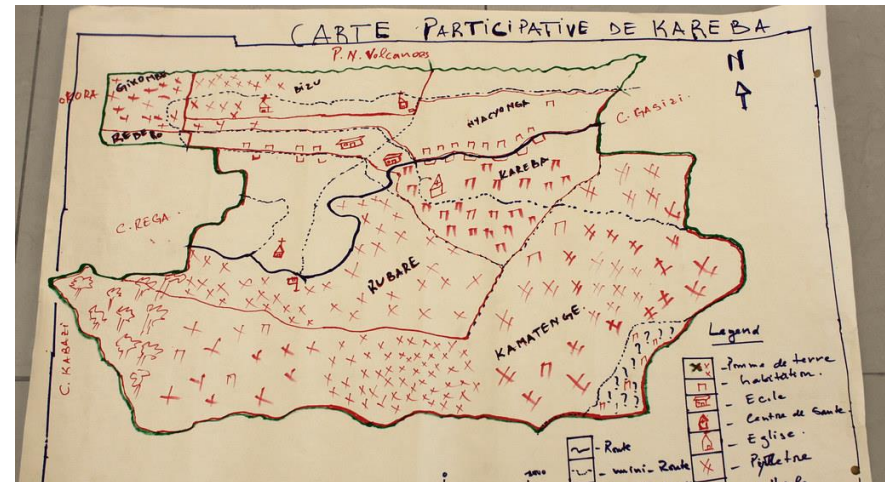


# FGDs Design

1. Specific objectives of FGDs
  - Which themes to be covered and for which purpose
2. Location, number & timing of FGDs
  - Where will be the venue?, How many times?, How long will it be conducted?
3. Composition of FGDs
  - Participants selection (who will be covered?)
4. Type of FGD
  - Categorization according to (Age, Gender and Diversity criteria)

# Participatory mapping

It is a map-making process that attempts to make visible the association between land and local communities by using the commonly understood and recognized language of cartography.





# Seasonal calendar

It is a group exercise that helps people explore and understand how ecological, social, and economic aspects of their lives and wellbeing change throughout the year.



# Transect walk

It is a tool for describing and showing the location and distribution of resources, features, landscape, main land uses along a given transect.





# Sample design

## Snowball sampling

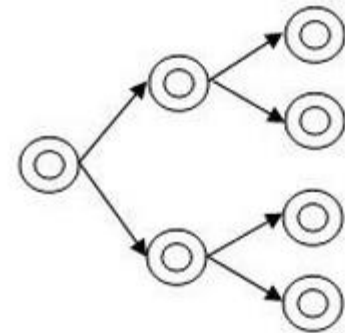
- It is a non-probability (non-random) sampling
- Primary data source nominates another potential primary data source.
- Its mainly use in business studies



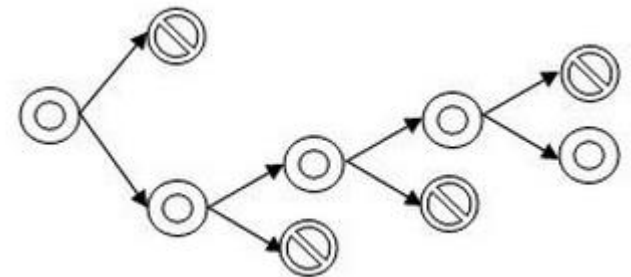
1. Linear snowball sampling



2. Exponential non-discriminative snowball sampling



3. Exponential discriminative snowball sampling



## Advantages and disadvantages of snowball sampling

Advantage	Disadvantage
<ul style="list-style-type: none"><li>1. Possible to reach hidden populations</li><li>2. Primary data collection is inexpensive</li><li>3. Data collection can be completed in short duration of time</li><li>4. Less planning is required to start primary data collection process</li></ul>	<ul style="list-style-type: none"><li>1. Oversampling a particular network of peers can lead to bias</li><li>2. Respondents may be hesitant to provide names of peers and asking them to do so may raise ethical concerns</li><li>4. There are fair chances even after referrals, people might not be cooperative and refuse to participate in the research studies.</li></ul>



# Key informants interview (KII)

## Key informants interview (KII)



**Obtaining information from a knowledgeable person, who has idea about the topic you are interested in.**

# How to find out key informant?

During Focus group discussion





# Key informants interview (KII)

- Qualitative, KIIs of 15-35 people
- Semi-structured questionnaires
- Free flow of ideas and information
- Interviewers frame questions spontaneously, explore for information and takes notes, which are elaborated later.
- Its useful in all phases of development activities - identification, planning, implementation and evaluation





## KIIs advantages and limitations

Advantages	Disdvantages
Rapport/trust can be build with the informant	Ohter members may be jealous if they are left out
Information directly from knowledgeable people	Not appropriate if quantitative data are required
Provide flexibility to generate new ideas and issues which are not anticipated during planning	Careful selection of informants are required Susceptible to interviewers biases
Inexpensive and simple to conduct	May be difficult to prove the findings



## Steps in conducting KIIs

1. Formulate the study questions
2. Prepare a short interview guide
3. Select key informants (should not exceed 35)
4. Conduct interviews
  - Build rapport
  - Sequence questions
  - Phrase questions carefully
  - Use probing techniques
  - Maintain a neutral attitude
  - Minimize translation difficulties
5. Note taking
6. Data analysis
7. Select reliability and validity







## Questionnaires – examples



### Questionnaire for interview with villagers

1. Name of the respondents : .....
  - a. Gender (F= female, M = male).....
  - b. Age.....yrs
  - c. Education.....
  - d. Occupation.....
  - e. Religion.....
  - f. Ethnic group.....
  
2. Household :
  - a. Total family number.....
  - b. Size of the farmland for cultivation.....
  - c. Details about farming system.....
  - d. What do you grow in your farm?.....
  - e. Income of household annually (from farming and off-farming activities)
  
3. NTFPs
  - a. Name the species you collect and from where?
  - b. How do you collect the species? Who are involved in collecting NTFPs (man or woman)?
  - c. When and how many times you collect the NTFPs?
  - d. How many species do you use and sale? Please give the priority to the species.
  - e. What are the prices of the different species per kg?
  - f. To whom and where you sell the NTFPs?
  - g. What is your annual income from NTFPs selling?
  - h. Are you satisfied with your income from NTFPs?
  - i. Do you buy NTFPs from others?
  - j. Do you exchange NTFPs for other things (e.g. rice)?



Data collection by using digital device



- k. Do you think middlemen/companies are earning much more than you from NTFPs selling?
- l. Have you taken any strategy to reduce this income difference?
- m. Which species do the companies prefer most?
- n. Can you supply the products according to the demand?
- o. In your view, what changes, have taken place in the Natural resources since you were a child/were collecting NTFPs? What are the reasons?
- p. Have you used some special strategies to cope with changing environmental conditions?
- q. In your opinion, how to manage the forests, so the NTFPs production can be sustainable
- r. Is there government ban on collecting NTFPs from forests?
- s. Could you manage without collecting NTFPs from forests?
- t. Do you grow any NTFPs in your farm?

#### **Questionnaire for interview with intermediaries**

For how many years you are involved in NTFPs marketing?

Which species you buy from the villagers?

When and from which villages you buy NTFPs?

What are the uses of those NTFPs?

What are the prices you pay to the villagers for those species?

To whom you supply the NTFPs?

Can you supply according to the demand?

What are the prices you get from the companies for supplying those species?

What is your annual income from NTFPs?

Are you satisfied with your income from NTFPs?

Do you think companies are earning much more than you?

Have you taken any strategy to reduce this income differences?

What are the changes you saw in the villages in last 30 years/from your childhood?



In your opinion, how to manage the forests, so the NTFPs production can be sustainable?

Is there any ban from govt. of collecting NTFPs?

Can you manage without collecting NTFPs from the villages?

#### **Questionnaire for Interview with the factory owners**

For how many years this company operating?

What are the main products of your company?

What are the raw materials you need to produce those products?

When and from whom you buy those raw materials?

What are the prices you pay to the suppliers for those raw materials?

What are the uses of those end products?

Where you supply the end-products?

Who are the end-users of those products?

Can you supply according to the demand of the end-users?

What is the annual income of your company?

Are you satisfied with your income?

Do you think suppliers are earning much more than you?

What are the changes you saw in the villages from establishing your company?

In your opinion, how to manage the forests, so the NTFPs supply can be sustainable?

What you will do if there are not enough raw materials?

Do you have any substitute product to replace the existing raw materials?

Is there any ban from govt. of collecting NTFPs?

Do you have to pay any tax to the government?

What is your future plan? Do you have any plan for the well being of the villagers?

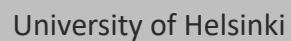


# Bamboo Value Chain analysis- Case Sangthong



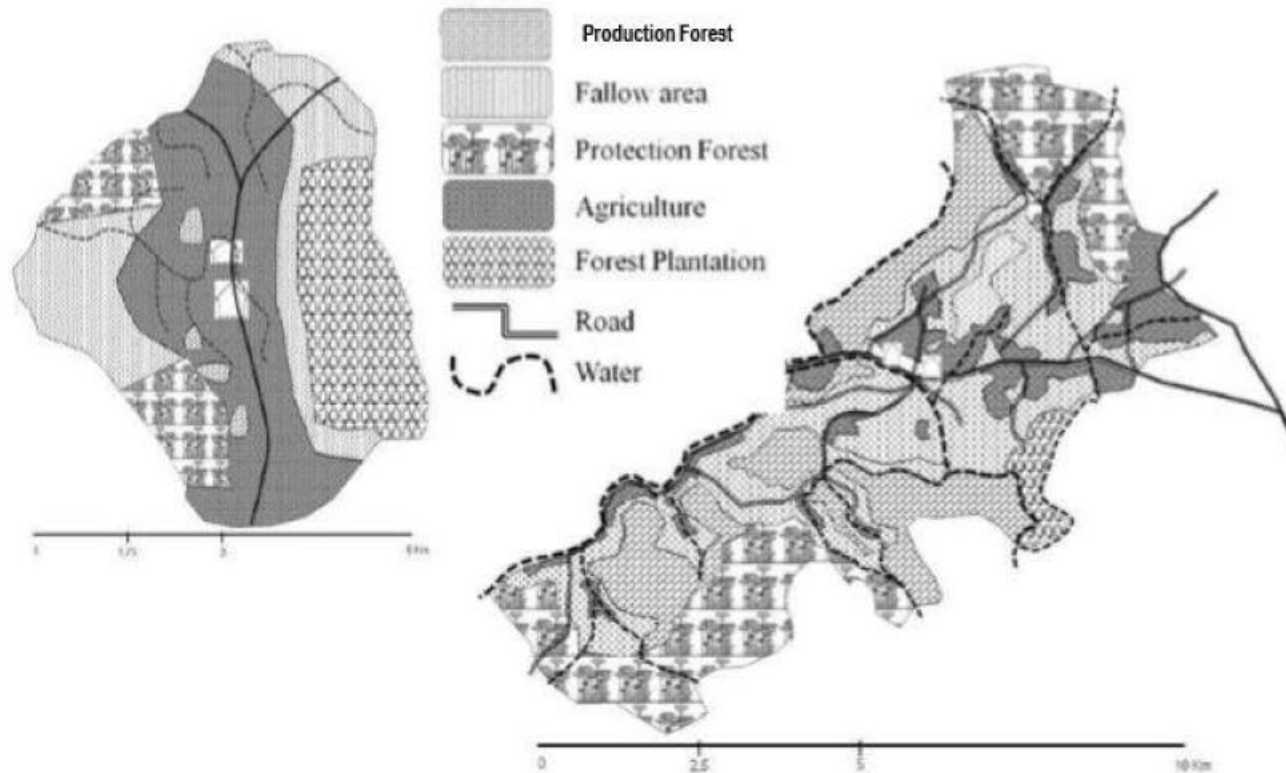
## Case Study Area: Sangthong

- Study was carried out between January-March 2010 in the Sangthong district
- Out of 35 villages, two villages: Ban Napo and Ban Kouay were selected to conduct the study based on species availability and villager's involvement in NTFPs production and trading
- Total land area of Ban Napo is about 2,591 ha and Ban Kouay is about 6,035 ha (WWF, 2010)
- Similar in topographical and vegetation structure, dominated with bamboo forest





# Land use in Ban Napo (left) and Ban Kouay (right)





## Main characteristics of two villages

Characteristics	Ban Napo	Ban Kouay
Number of households	92	128
N sampled	25	25
Average age	43.4yr	43.5yr
Average farm size	9.28ha	6.98ha
Literacy rate (primary education)	60%	72%
Average annual income	7.46 million kip	6.78 million kip
Average annual income NTFPs (% from total)	1.51 million kip (20.24)	1.09 million kip (16.07)

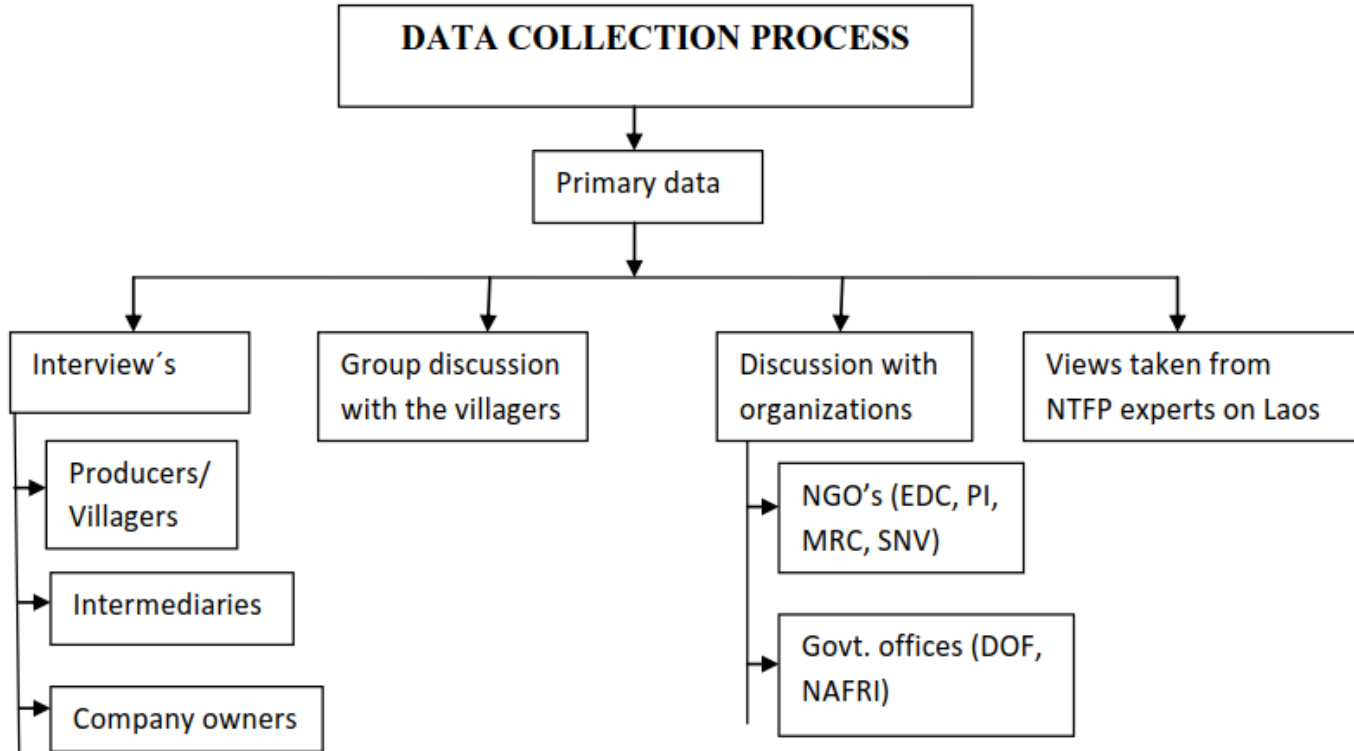
## Income difference according to age

Age group (yr)	Avg. total income (million kip/yr)	Avg. NTFPs income (million kip/yr)	NTFPs share (%)
Below 30	5.87	1.69	28.79%
31-50	8.92	1.16	13.00%
above 50	6.33	1.19	18.79%
<i>P</i> -value	0.204	0.503	0.694
* $P < 0.1$ ** $P < 0.05$			

## Income difference according to farm size

Farm size (ha)	Avg. total income (million kip/yr)	Avg. NTFPs income (million kip/yr)	NTFPs share (%)
Less than 5	4.99	1.17	23.44 %
5.1-10	6.99	1.12	16.02 %
10.1-15	11.40	2.24	19.65 %
More than 15	10.33	1.73	16.74 %
P-value	0.046 **	0.284	0.871
* $P < 0.1$ ** $P < 0.05$			

# Bamboo mats value chain

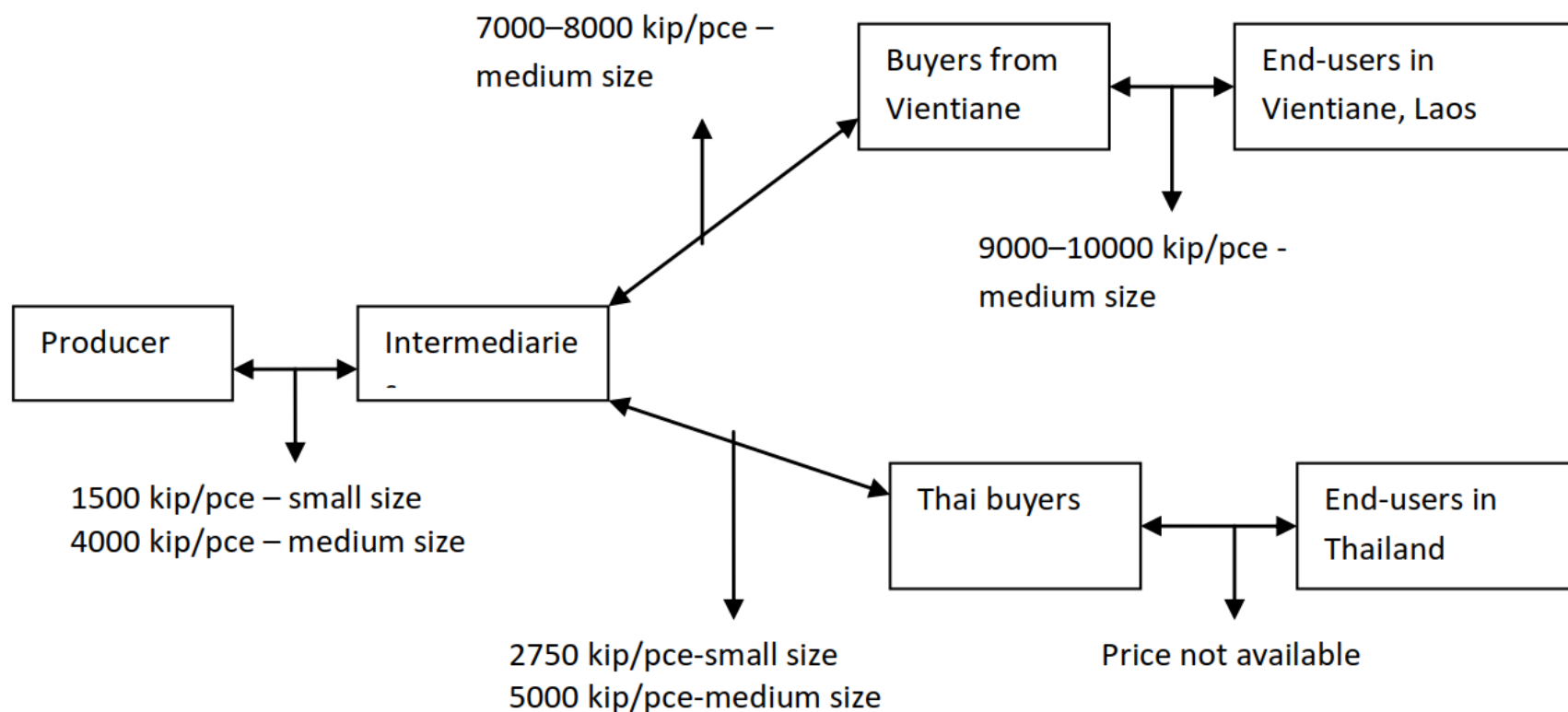




## Bamboo Mats value chain

- Villagers were rich in bamboo forests and were used in villagers livelihoods
- Three species were used to produce bamboo mats – Mai Hia, Mai Phang and Mai Sod
- Both men and women were involved in producing mats
- Bamboo poles were collected from January – May and Lao govt. rule allowed 1000 poles/family/year
- Tax needed to pay to different Govt. Organizations for collecting bamboos i.e. village, district, province etc.
- No major barriers to enter value chain
- Buyers driven value chain
- Satisfied with income but want to earn more!
- Bamboo handicraft production could be an option for higher income!

## Bamboo mats value chain





Pic: Bamboo mat product flow



## Bamboo mats production system



1. A woman is slicing the bamboo poles



2. A man is making bamboo mats



3. Bamboo mats are ready to sell



## Bamboo mats trading at Thai-Lao border



1. Mats are kept at the border



2. Boats are ready for shipment



3. Boats are filled with mats

## Upgrading options: Bamboo handicraft



1. Villagers are cutting the poles



2. Instructor is guiding the villagers



3. Sample handicraft



4. Villager is making handicraft at home



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Thank you very much