

Main Research Finding on Development of Benzoin (*Styrax tonkinensis*) Value chain in five Upland provinces (Houaphanh, Luangprabang, Phongsaly, Oudomxay and Xiengkhouang) of Laos



Policy Think Tank

National Agriculture and Forestry Research Institute

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Formulate policy recommendation to ensure sustainable upland farmer income through NTFPs to contribute poverty reduction and food security in upland communities.

Outline

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II. Methodology

III. Finding

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3.2 *Styrax tonkinensis* Distribution Area

3.3 Best practice of Silviculture

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3.5 Role of Benzoin for local upland livelihood

3.6 Analyze SWOT

IV. Conclusion and Policies recommendation

4.1 Conclusion

4.2 Policies recommendation



I. Introduction

- Achieving the MDG 1 in the Lao PDR, development of rural economy plays a vital role.
- Agriculture development is contributing more than 25 % of the GDP and nearly 70 % of the labor force is engaged in multitude of agriculture development activities.
- NTFPs is one component of forest resource which plays important roles in the socio-economic development in rural areas of Lao PDR.
- Some areas of uplands are blessed with natural growth of: cardamom, cinnamon, benzoin (nyan), herbs, mushrooms and many others.

I. Introduction (cont)

- Benzoin resin is the NTFP extract important because of their high value and quality and high demand from international markets.
 - Production offers significant economic opportunities to smallholders.
 - Competitive advantages of Laos in international markets.
 - Possibility of cultivation and environmental benefits.
- *S. tonkinensis* is exported to european countries of which 70% of the production is estimated to be export from Laos, thus Benzoin resin in international market is seemed sustainability.
- The higher quality of Lao Benzoin resin is used mainly in the manufacture of fine fragrances.



Issues and problems

1. Resource

- Production was declined, due to price was not sufficiently attractive to induce the people to tap the trees.
- Recently, the forest areas where *S. tonkinensis* grows has contributed to the decrease.
- While the supply of Benzoin is dependent on the availability of suitable trees to tap and the willingness of people.
- The decreasing length of the shifting cultivation cycle means because shorter cultivation cycles means younger trees (Not yet reached their optimal age) cause yield less. Therefore, the supply base for benzoin is becoming less secure.

2. Processing and Marketing

- Benzoin exported from Lao PDR (collected from the tree), it has been cleaned and graded and thus, producers get a low price for it.

Issues and problems

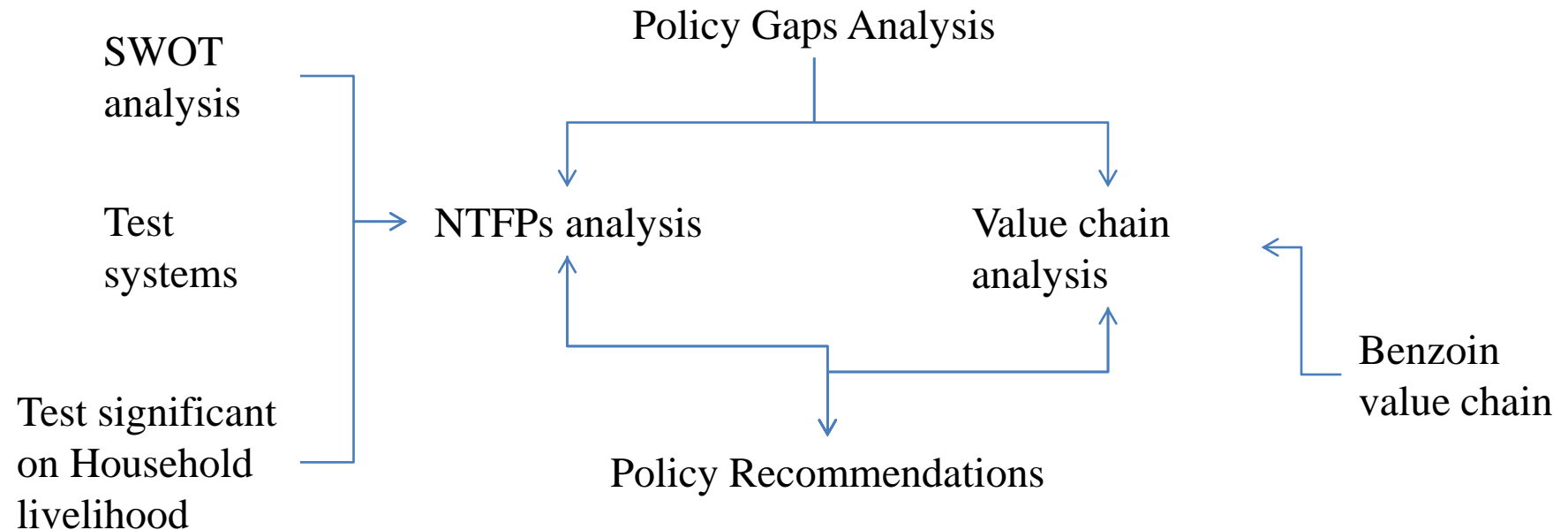
3. Social and policy

- Attitude of the people to tapping the trees, the task of tapping is arduous work.
- Government restrictions on forest clearance has reduced the length of the shifting cultivation cycle and this may be detrimental for benzoin extraction.
- Government guidelines only allow the benzoin traders who have registered with PAFO to deal directly with villagers collecting benzoin. These traders cannot buy benzoin more than the quota being approved by PAFO.
- The current export tax system, there are many constraints (disincentive, procedures and considerable delays), Such constraints may have probably resulted in missing business opportunities,

Objectives

- To identify the natural Benzoin distribution area (Mapping) in Laos with its yield capacity.
- To investigate and examine the best practise of silviculture techniques in term of plantation and natural area.
- To analyse production system, value chains of Benzoin in order to identifying the constraints and opportunities that inhibits value chain growth and competitiveness and compared with other cash crop in upland area.
- To analyse the policy gaps in order to provide recommendations for Benzoin development policies for upland smallholders, the role of Benzoin on household livelihoods and poverty alleviation.

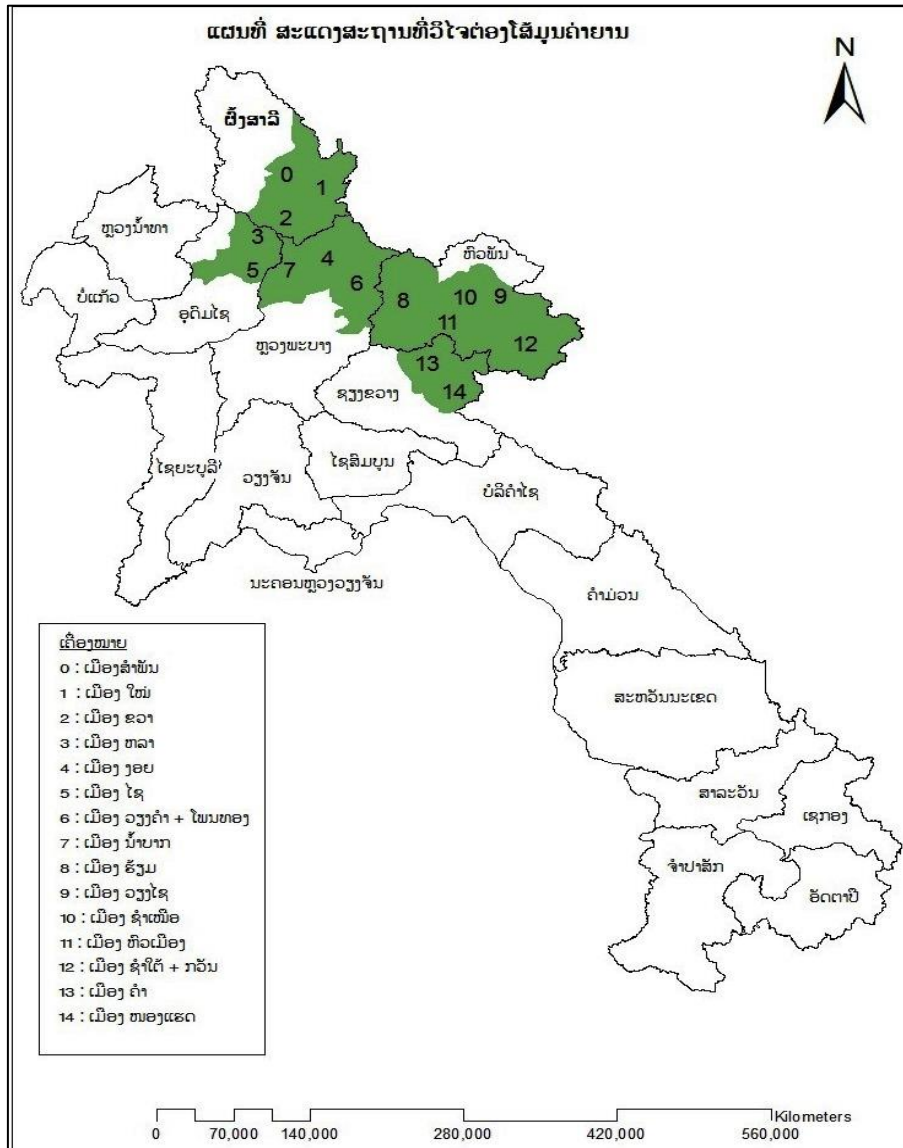
Conceptual Framework



II. Methodology

- Literature Review: Conducted the reviewing of existing policies and relevant research report in regard with Benzoin production processing and trading in five Northern upland provinces
- Scoping mission and field survey for *Styrax tonkinensis* distribution area in five provinces.
- Interview concerning stakeholder at central, local level and Household survey: Benzoin production system, Trading and Marketing in Three provinces as: PAFO, DAFO, PICO, DICO, PFO, DFO, PPCO, DPCO, Trader, Broker, and Farmer.
- Analyze and Report writing

Research Site



- Totally: 223 households (10% of total HH)
- 42 Villages (13 villages in PSL, 16 villages in HPH and 13 villages in LPB)
- 9 Districts: Viengxai, Houamuang, Samnue in HPH, and Mai, Samphan, Koa in PSL province and Nambak, Ngoy, Phonthong in LPB

III. Research Finding

3.1a Relevant NTFPs Policies

(1). Law (11):

- NA (2003). Land Law (Update), No. 04/NA, Date 21/10/2003. VTC .
- NA (2007). Forestry Law (Update), No. 24/NA, Date 24/12/2007. VTC
- NA (2009). Investment Promotion Law, No.02/NA, Date 08/09/2009. VTC
- NA (2011). Small and Medium Enterprise Promotion Law, No. 27/NA, Date 21/12/2011. VTC.
- NA (2012). Environmental Protection Law (update), No. 041/NA, Date 18/12/2012. VTC.
- NA (2013). Industry processing Law (Update), No. 48/NA, date 25/12/2013. VTC.
- NA (2012). Tax Law (Update), No. 21/NA, date 16/1/2012
- NA (2008). Contract and Tort Law, No. 01/NA, date 8/12/2008
- NA (2012). Customs Law. No. 20/NA, date 16/1/2012
- NA (2015). Value add Tax Law. No.033/NA, date 30/1/2015
- NA (2008). Plant Quarantine Law. No. 06/NA, date 9/12/2008.

3.1a Relevant Forest and NTFPs Policies

(2). Decree (3):

- PM (2008). Decree on Production Forest Area, No. 270/pm, date 30/12/2008.
- PM (2010). Decree on Protected Forest Area, No. 333/pm, date 18/07/2010.
- PM (2015). Decree on National Biodiversity Conservation Area, No. 134/GOV, Date 13/05.2015

(3). Strategies (5):

- MAF(2005). Forest Strategy 2020, No.227/PM, Date 09/08/2005.
- Poverty Eradication Strategy 2020.
- Environment Strategy 2020.
- Biodiversity Conservation Strategy 2020.
- Agricultural Development Strategy 2025, Vision to 2030

3.1b Reviewing of Existing relevant research report

- Benzoin comes from tree species of the genus *Styrax* in the family Styracaceae. *Styrax* contains about 130 species of trees and shrubs occurring in tropical to temperate climates. Three centres of distribution are described: southeastern Asia, southeastern North America to South America, and a single species in the Mediterranean (FAO, 1996).
- In Southeast Asia, tree species *Styrax* there are three species produce extract resin (fragrance) consist of (1) *Styrax tonkinensis* (Pierre), (2) *Styrax benzoin* Dryand and (3) *Styrax paralleloneurum* Perkins. Benzoin tree (*Styrax tonkinensis*) is distributed in Laos and Vientnam. While other two species (*S. benzoin* & *S. paralleloneurum*) is distributed in Indonesia and Malaysia (Orwa et al 2009)
- In Vietnam, Benzoin tree (*Styrax tonkinensis*) found Northwest, there were been planted in large scale (20,000 ha) for supply pulp purpose. On other hand they were grown for environmental purpose such as wind break, provide shad in tea plantation (Orwa et al. 2009).
- Ecology and distribution condition of Benzoin tree is found in area where elevation upper 700 m, mean annual rainfall 1500 mm to 2,200 mm and mean annual temperature 15-16 °C. Soil type is required the prevalent soil texture is clay-loam with a higher portion of loam in the upper soil layers with medium to high level organic matter (>2.0%) The soil is acidic with a pH below 4.5 and a very low base saturation.
- Benzoin tree is a pioneer species, demand light and it is normally found in fallow land in large scale upland area of Laos (Horst Weyer- haeuser, et. al. 2011)

3.1b Reviewing of Existing relevant research report

Refer to NAFRI, NUoL&SNV, 2007:

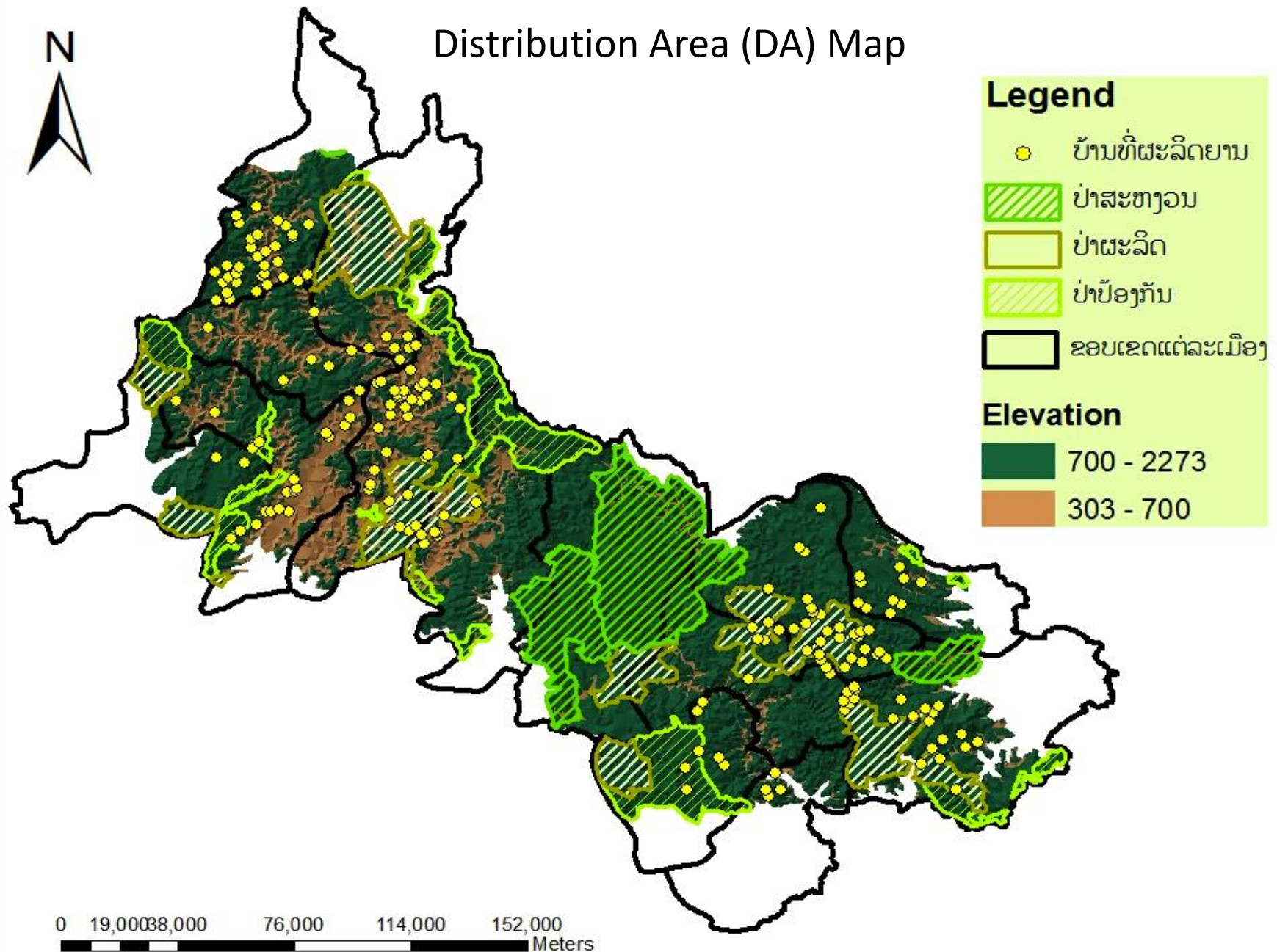
- Benzoin resin (white color) contains 10 – 20% benzoic acid, 60-70% coniferyl benzoate and 6% soaresinol, with some cinnamic acid and vanillin, which has the smell of vanilla. The total balsamic acid of Benzoin resin (Red color) is 2-25% cinnamic acid with some benzoeresinol, benzoidhyle, benzoic acid and vanilla, Benzoin do not dissolve in water, only in alcohol.
- Benzoin tree can produced high yield when seven – ten years old. A tree is provide resin 0.5 kg/year in average.
- Benzoin tree are often integrated into fallow lands, since 1996 in after land allocation implemented cause shifting cultivation cycle have been reduced to four years, and Benzoin tree are no longer encouraged on fallow lands because of they require at least six years o f growth.
- Tapping the benzoin tree in many holes cause yield decrease or die.
- In 1993, Laos produced over 100 ton of benzoin, a figure that began to drop by 40 ton annually. However a new study revealed that annual production is up to 120 – 150 ton, which are exported to France, Thailand, Vietnam and China. In provincial towns tapper can currently sell their harvest at USD 1.5 – 3 per kg. In China in 1991, top quality benzoin cost USD 22 per kg and in 1993 the price for top quality benzoin in Europe was USD 15-20 per Kg.
- In general exports are waning as synthetic chemicals replace benzoin. Many households have stopped tapping benzoin tree because of low price, but poor family still depend on this cash income. There are signs of positive price movements in the Benzoin market.

3.2 Benzoin Tree *Styrax tonkinensis*' distribution Area

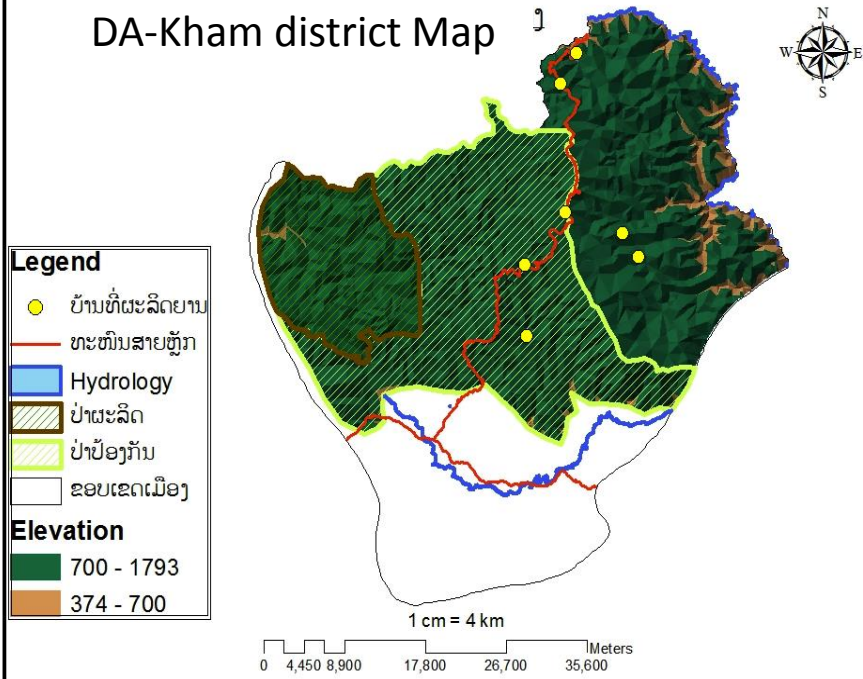
3.2.1 Distribution Area

No.	Province & district	No. of Villages	Distribution Area				
			D-Area (ha)	NBCA (%)	FPA (%)	PFA (%)	Agri Land (%)
1	<i>Xiengkhouang</i>	20	187,686	-	35.71	13.11	51.18
-	Kham district	15	146,601	-	45.27	16.78	37.95
-	Nong haed district	5	41,085	-	1.6	-	98.4
2	<i>Houaphanh</i>	82	784,641	7.79	2.79	18.42	71
-	Houamouang dist.	8	211,972	9.4	-	18.71	73.22
-	Samnue dist.	39	249,964	7.68	-	18.71	73.61
-	Viengxay dist.	7	101,935	2.76	2.76	-	94.48
-	Samtai&Kouan dist.	28	220,770	8.7	8.64	27.58	55.07
3	<i>Luangprabang</i>	47	427,082	2.86	21.22	11.52	64.39
-	Nambak dist.	12	80,274	-	22.34	1.31	76.53
-	Ngoy dist.	15	139,150	-	12.22	24.87	62.91
-	Phonthong&Viengkham	20	207,658	5.89	26.82	6.53	60.77
4	<i>Oudomxay</i>	10	175,079	-	13.07	18.69	68.24
-	La dist.	5	87,028	-	26.3	14.79	58.91
-	Xay dist.	5	88,051	-	-	22.55	77.45
5	<i>Phongsaly</i>	81	351,886	-	6.29	18.87	74.84
-	Kao dist.	41	99,418	-	-	-	100
-	Samphanh dist.	31	123,128	-	-	-	100
-	Mai dist.	9	129,340	-	17.12	51.33	31.55
Total (1+2+3+4+5)		240	1,926,374	3.81	11.66	16.48	68.05

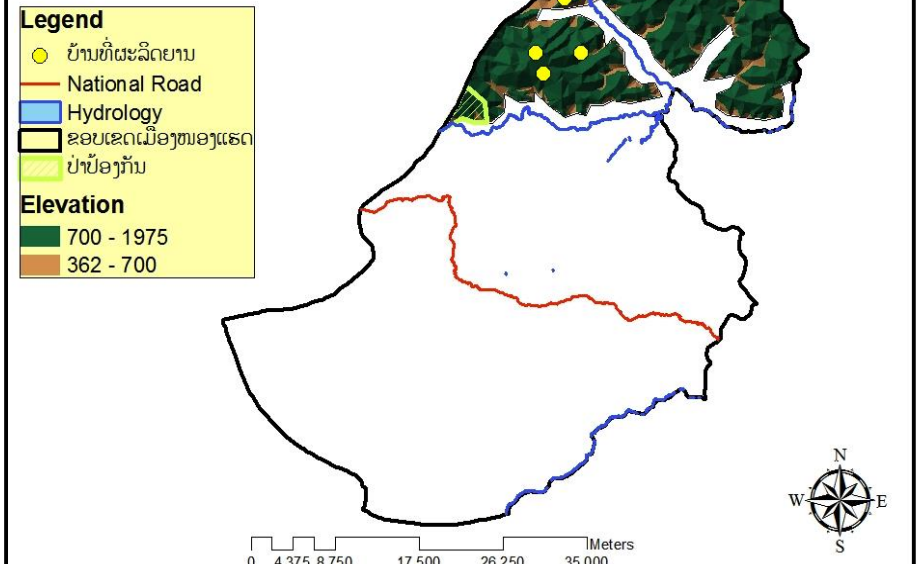
Distribution Area (DA) Map



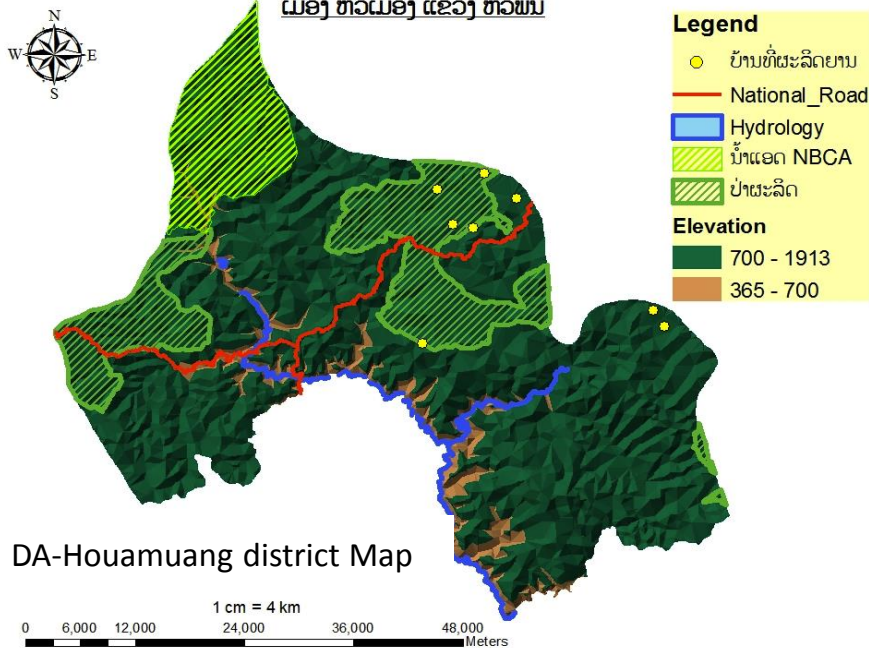
DA-Kham district Map



DA-Nonghaed district Map

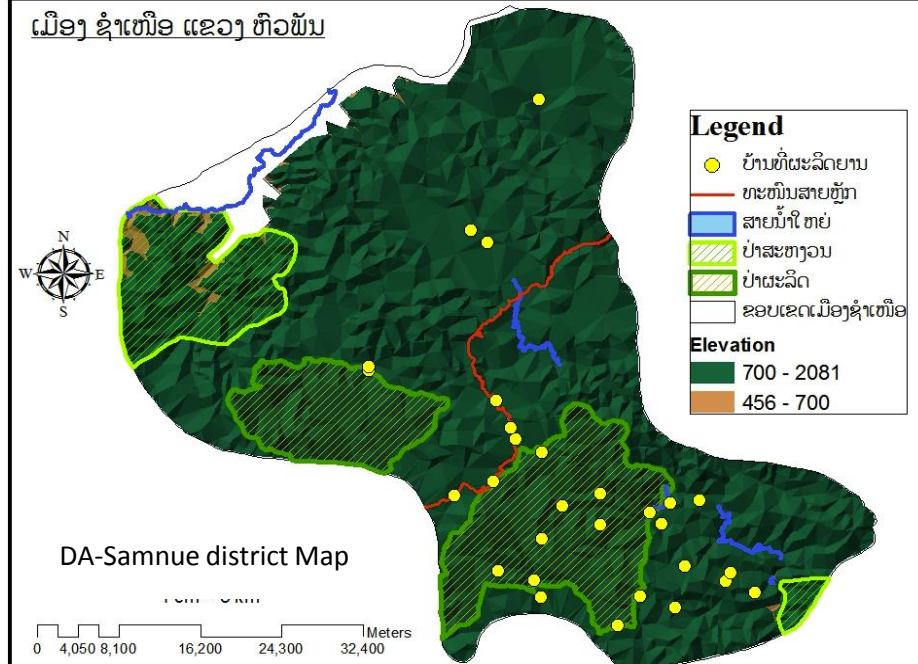


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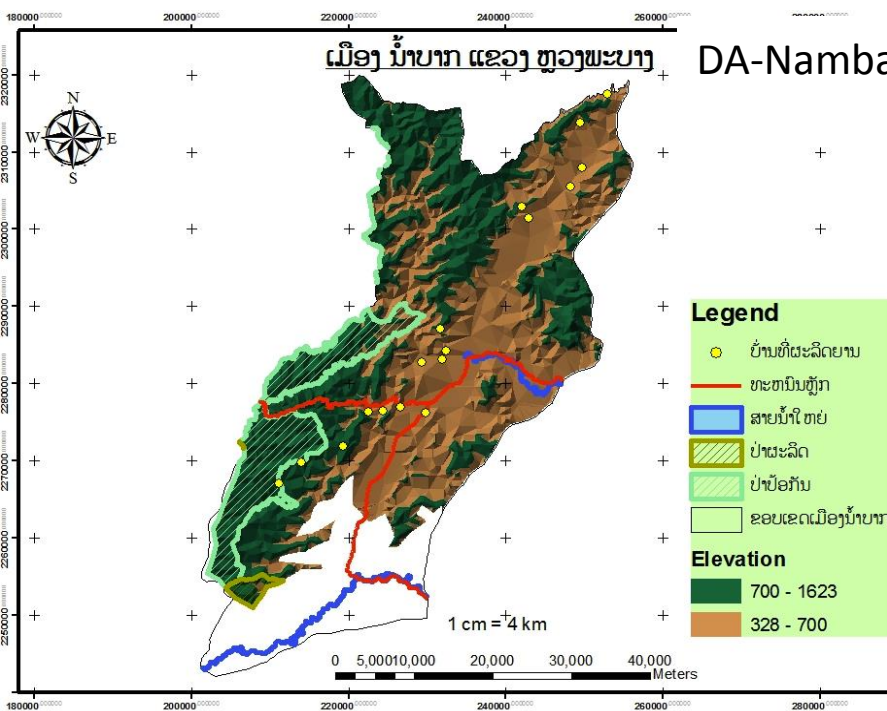
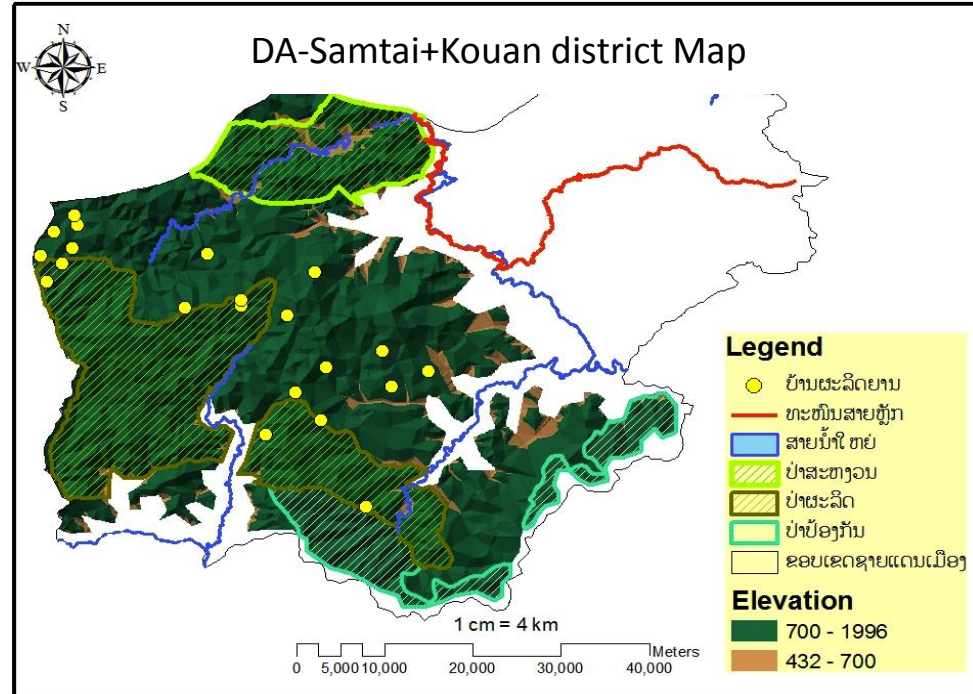
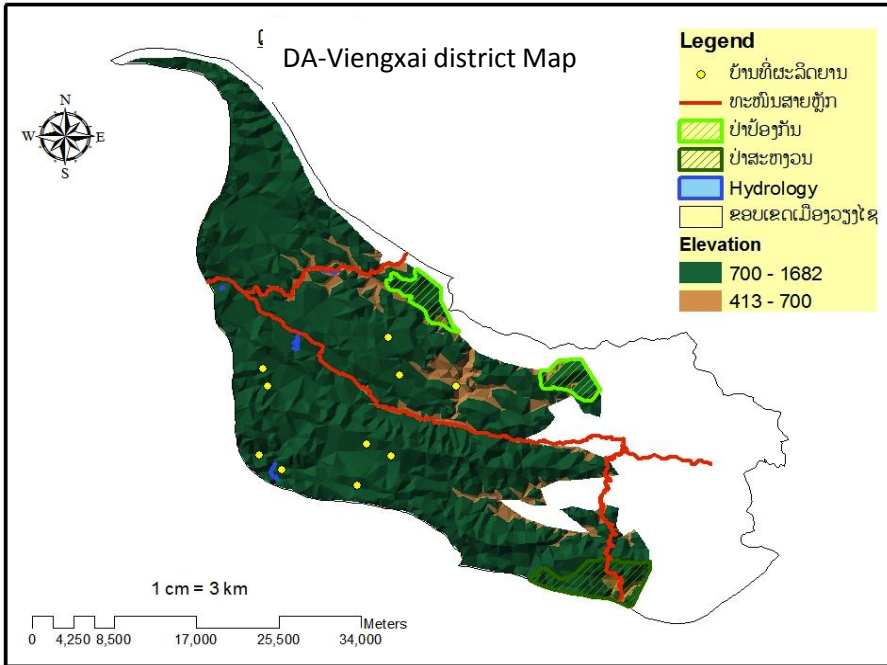


DA-Houamuang district Map

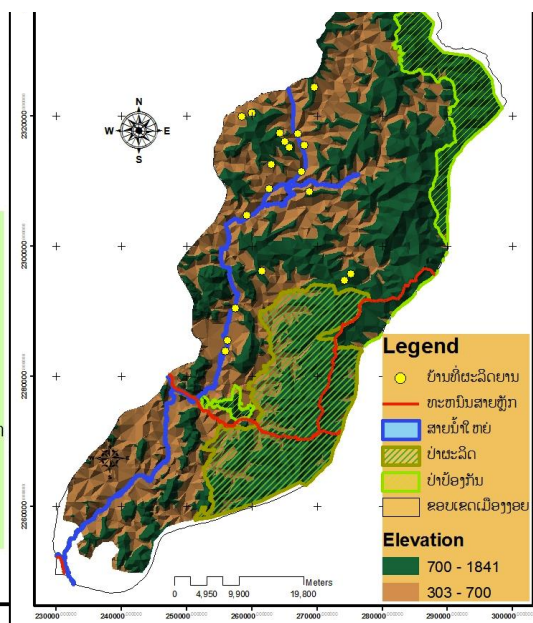
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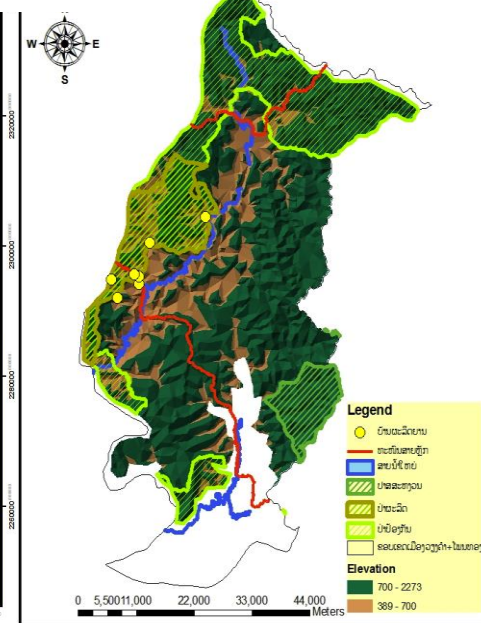
DA-Samnue district Map

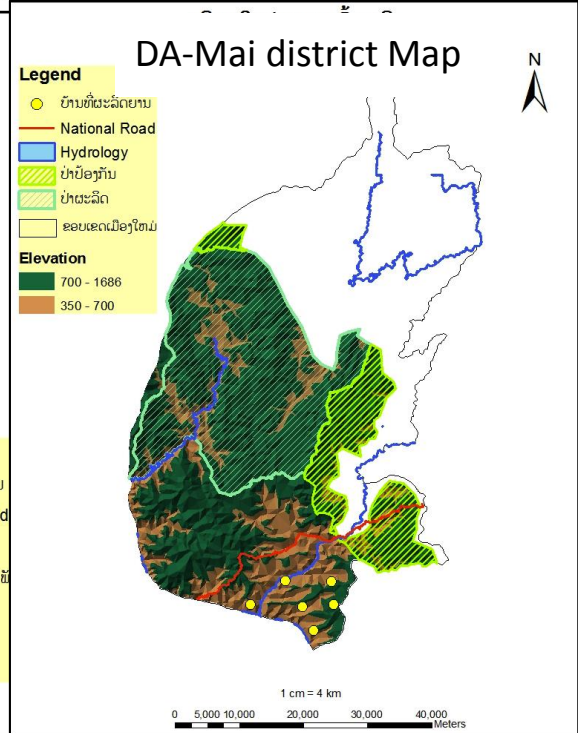
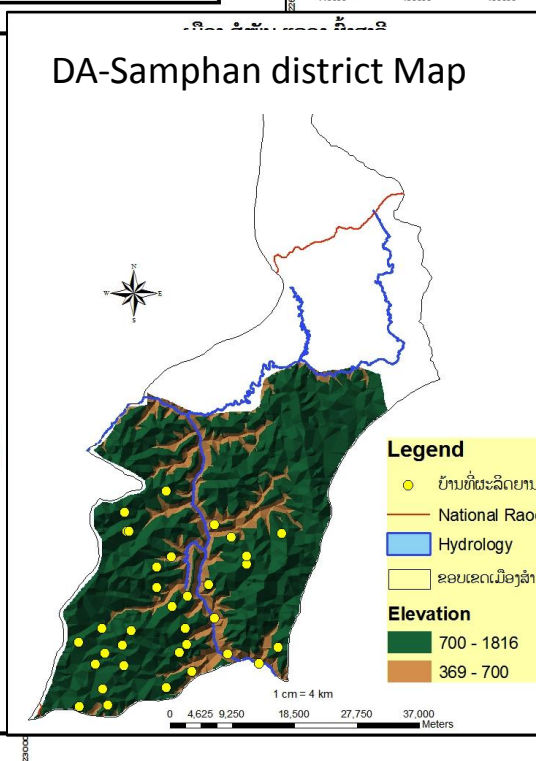
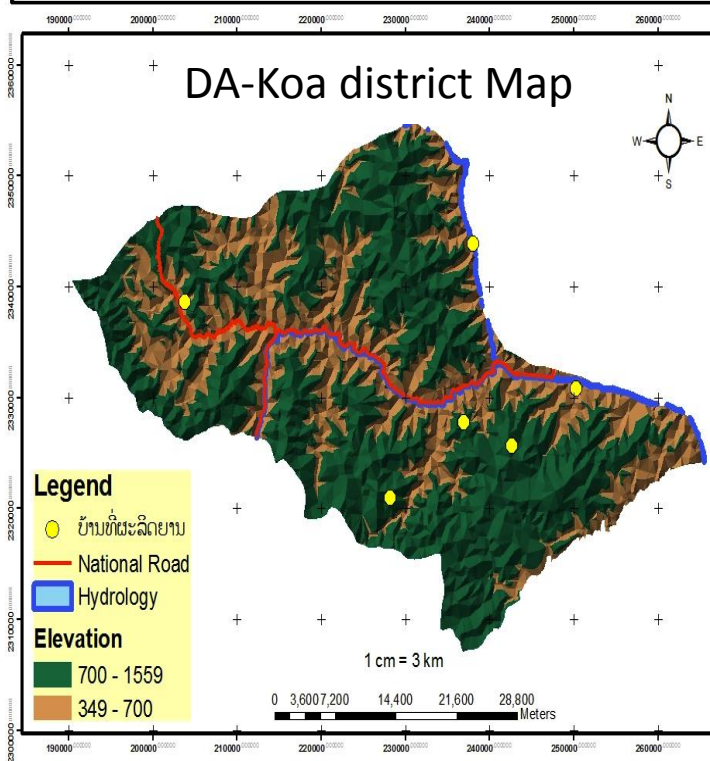
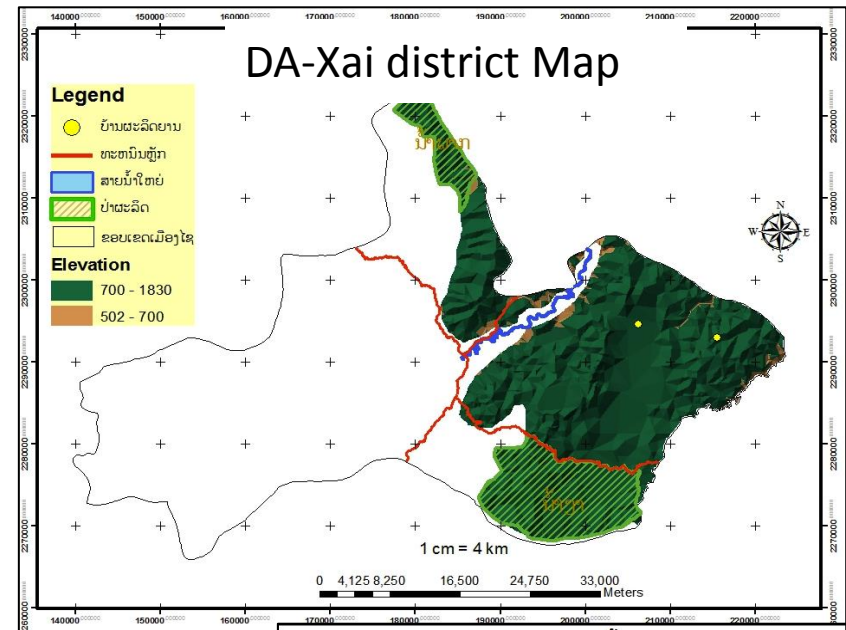
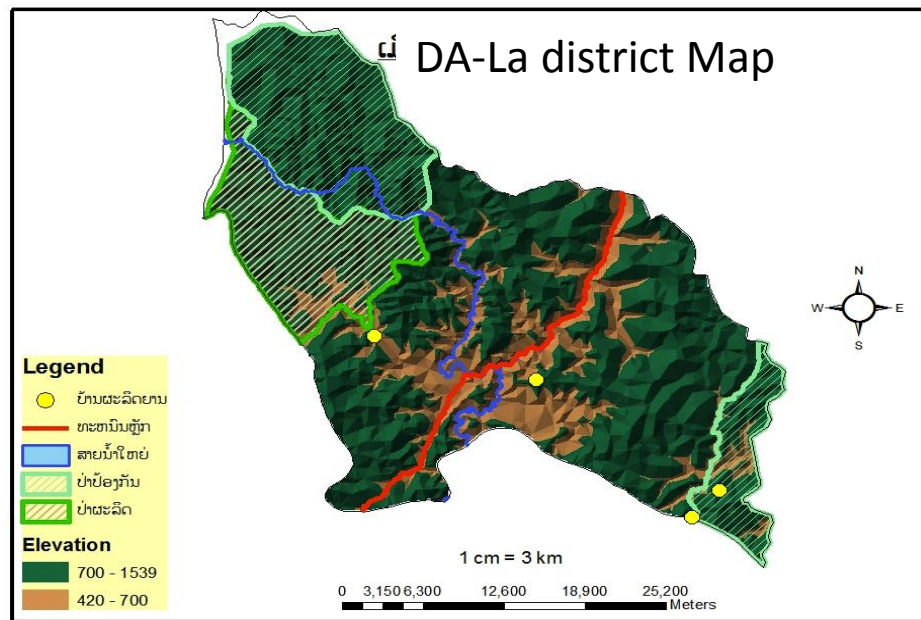


DA-Nambak, Ngoy, Phonthong district Map



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3.2.2 Current Benzoin Production Area (BPA)

No.	Province & District	No. of Villages	Farmer (hh)	BPA (Ha)	AV (ha/hh)
1	HPH	69	1,397	2,432	1.74
-	Houamuang	3	13	9	0.69
-	Samnue	39	794	1,541	1.94
-	Viengxay	7	150	379	2.53
-	Samtai	11	219	423	1.93
-	Kouan	9	221	80	0.36
2	LPB	34	730	1,528	2.09
-	Nambak	12	285	536	1.88
-	Ngoy	15	271	578	2.13
-	Phonthong	7	174	414	2.38
3	PSL	81	1,158	1,347	1.16
-	Kao	41	623	350	0.56
-	Mai	9	167	120	0.72
-	Samphanh	31	368	877	2.38
	ໂດຍ (1+2+3)	184	3,285	5,307	1.62

3.2.3 Benzoin Productivities

Provinces	Age (Year)	Average productivities				Calculated by BPA (t/y)
		Tree/ha	Tapped tree	Gm/tree	Kg/ha	
HPH	5 – 7 (n=15)	200	69	180	16.2	
	8 – 10 (n=29)	200	79	280	22.12	
	11 – 15 (n=23)	200	51	340	17.34	
	Mean		92	267	17.29	42.06
LPB	5 – 7 (n=13)	290	93	150	13.95	
	8 – 10 (n=24)	290	77	170	13.09	
	11 – 15 (n=6)	290	93	180	16.74	
	Mean		88	167	14.59	22.3
PSL	5 – 7 (n=13)	400	256	170	43.52	
	8 – 10 (n=14)	400	320	180	63.36	
	11 – 15 (n=0)	-	-	-	-	
	Mean		288	175	53.44	71.98
note: n=number of sample						

3.2.4 Concept: Expand-BPA in next step

[illegible]

3.3 Silviculture Practice

1. Maintained techniques applied in Benzoin tree farm (local knowledge base)

Activities	Month						
	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Seedling-Nature	√						
Conserve and enrichment planting		√	√				
Cutting-top stem				√	√		
Spacing maintain						√	

2. Knowledge base: timeline for tapping and collecting gum Benzoin

Age (Y)	Tapping time schedule					collecting time schedule			
	Aug.	Sep.	Oct.	Nov.		Feb.	Mar.	Apr.	May
5-8	√	√				√	√		
9-15 ↑			√	√				√	√

Young Benzoin tree, 6-8 months old



Photo by: Mr. Phounmy, Heap of Phonthong DAFO, 2016

Growth performance of Benzoin tree in fallow land

location	Age: 1-3 years old		Age 4-7 years old	
	Ht (m)	GBH (cm)	Ht (m)	GBH (cm)
Sammeun	2.45	6.8	11.30	28.6
Kampom	1.36	4.3	8.52	20.4
H.talo	1.48	4.6	11.48	18.7
Namluang	1.47	4.2	10.33	20.9

Source: Phonthong DAFO, 2016

Yield performance in different age class

Immature tree 5-7 years old



Mature tree 8-15 Years old and more

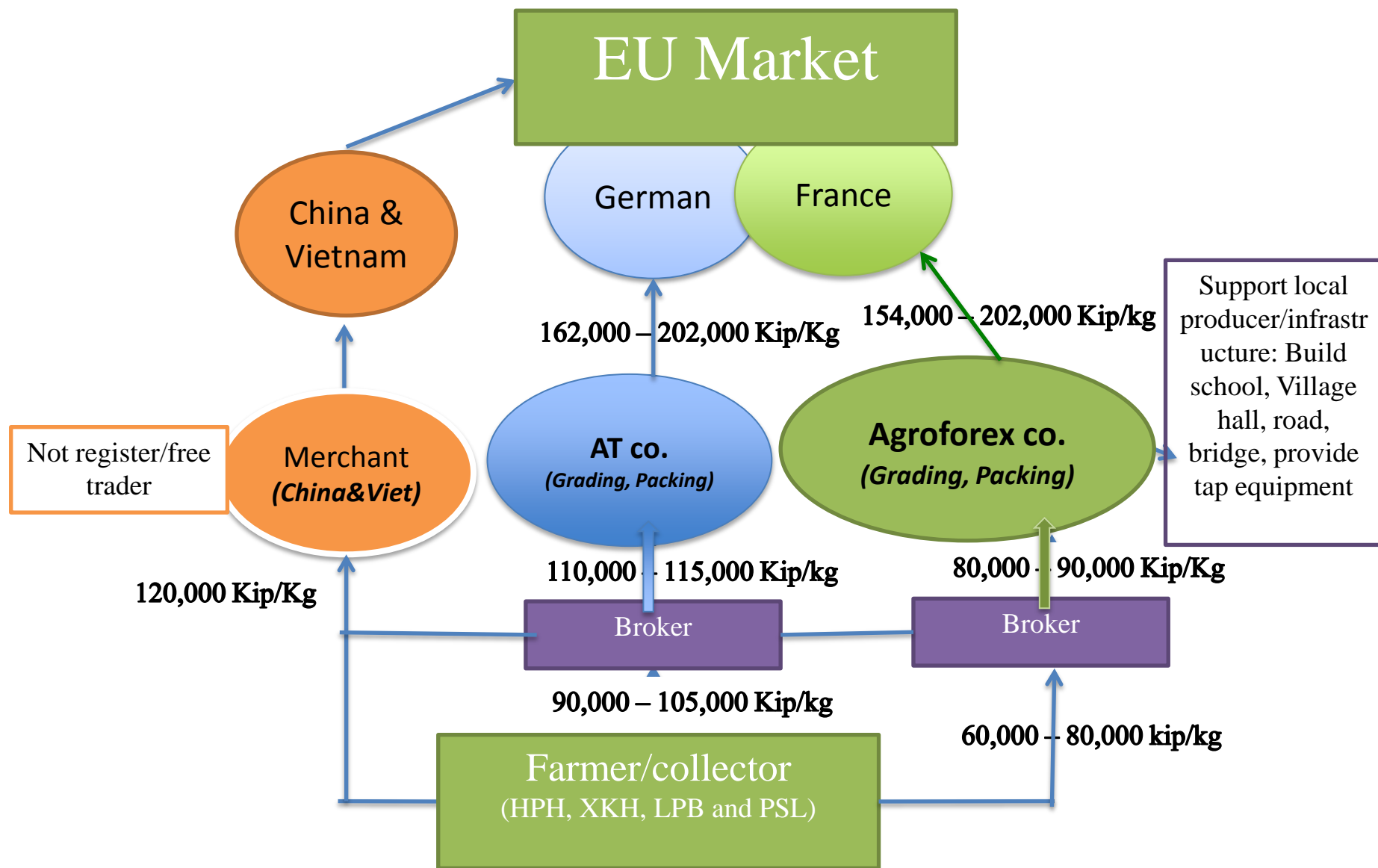


Problem and Challenges on Benzoin production

1. Benzoin tree is grown in their own microclimate only (Elevation >700, suitable temperature, Rain fall, Soil properties and location)
2. Population increase >> the demand of land for agriculture practice increase cause land not enough >> Rotation of upland rice cultivation decrease >> reduce Benzoin tree age cycle unsure Benzoin seed quality.
3. Best practice of Benzoin Silviculture are interested by young people decrease due to there are other options.
4. Lack of local authority policy support to promote Benzoin production such as Technical Service, recommended suitable area for Benzoin production.

3.4 Value Chain and Export

3.4.1 Value chain Figure

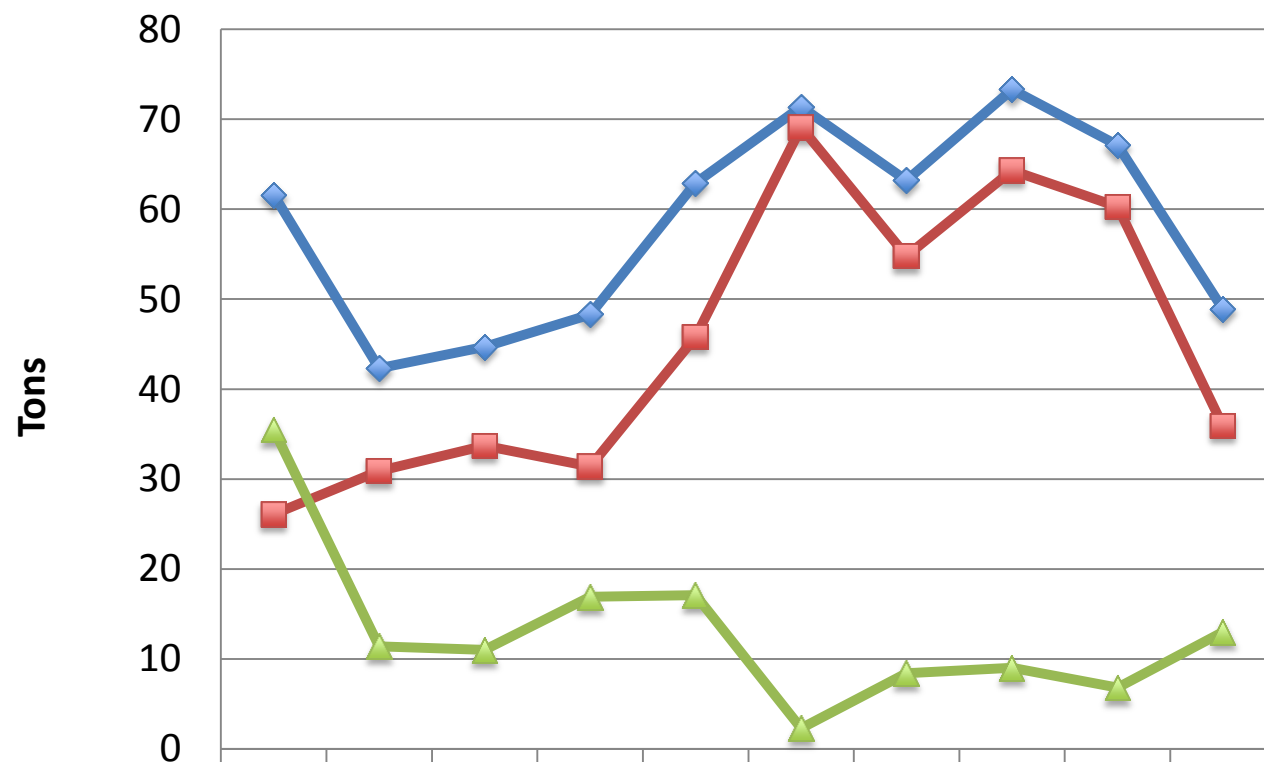


3.4.2 Benzoin products at local level since 2006 – 2015

Provinces	Benzoin products, since 2006 - 2015 (Ton)										AV (T)
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
HPH	5.93	4.31	9.12	8.45	12.28	10.72	4.81	4.88	8.65	9.65	7.88
PSL	23.42	33.47	30.43	21.24	33.08	39.1	21.74	35.42	25.1	9.22	27.22
LPB	n.a	n.a	n.a	5.5	6	27	31.5	24.1	27	17.2	13.83
Sum	29.35	37.78	39.56	35.19	51.36	76.82	58.04	64.4	60.75	36.07	48.93
Index (%)	100	129	135	120	175	262	198	219	207	123	

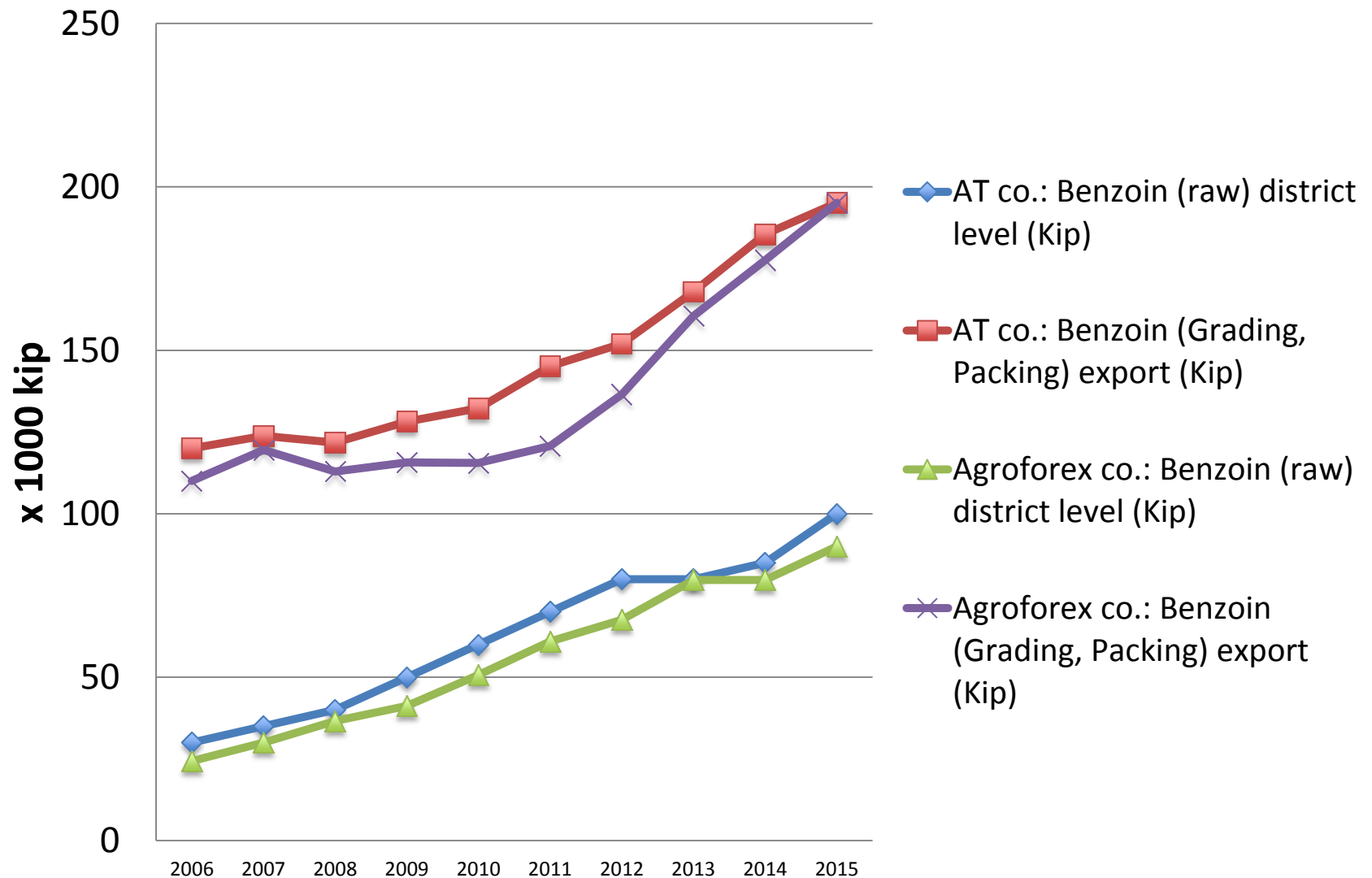
3.4.3 Export Lao Benzoin to European Market

Total Lao Benzoin products 2006-2015

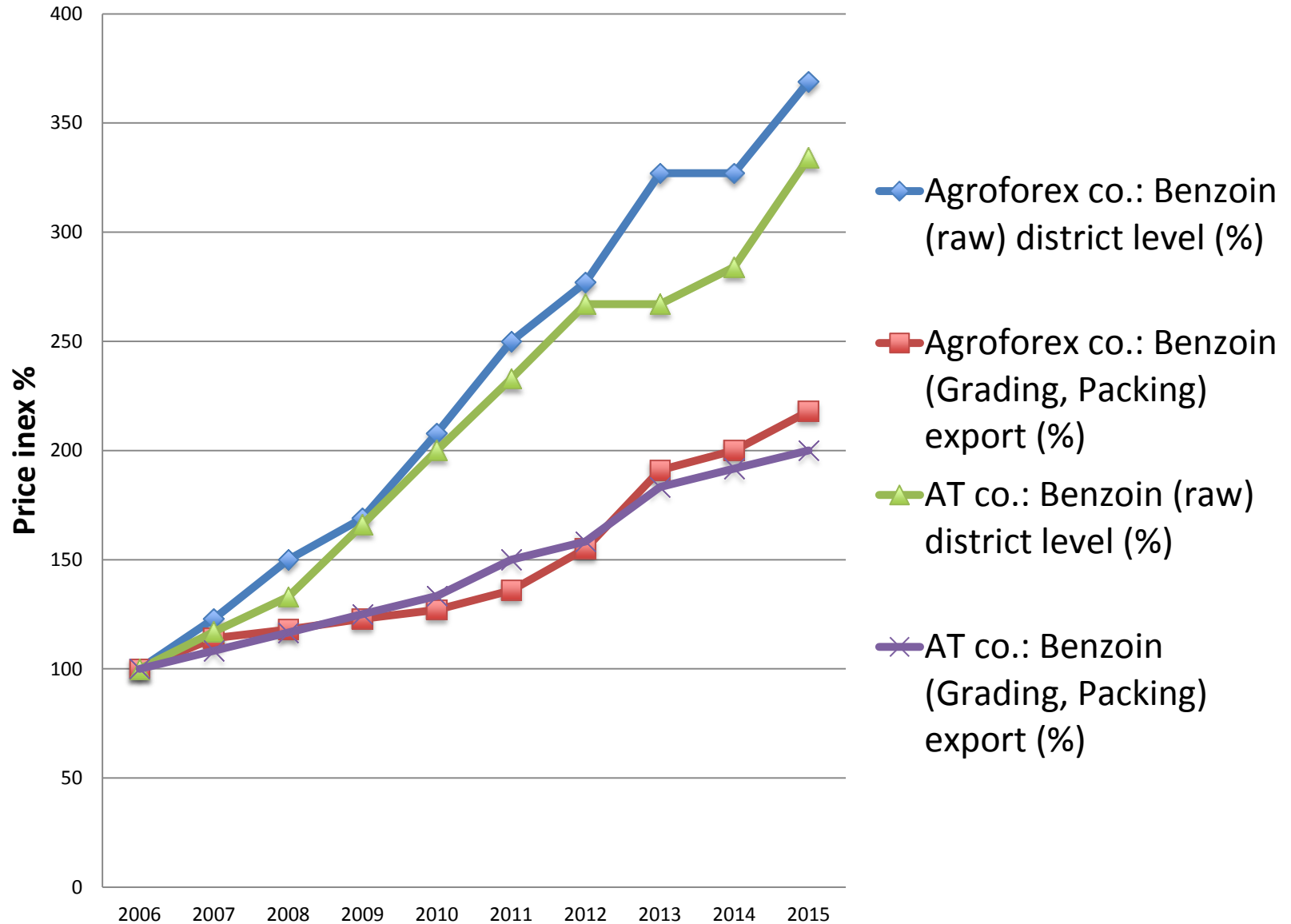


◆ European import of Lao	61.6	42.3	44.7	48.3	62.9	71.4	63.2	73.3	67.1	48.9
■ Laos export directly to EU	26.1	30.9	33.7	31.4	45.8	69.1	54.8	64.3	60.3	35.9
▲ Illegal Exported to Nbhc	35.5	11.4	11	16.9	17.1	2.3	8.4	9	6.8	13

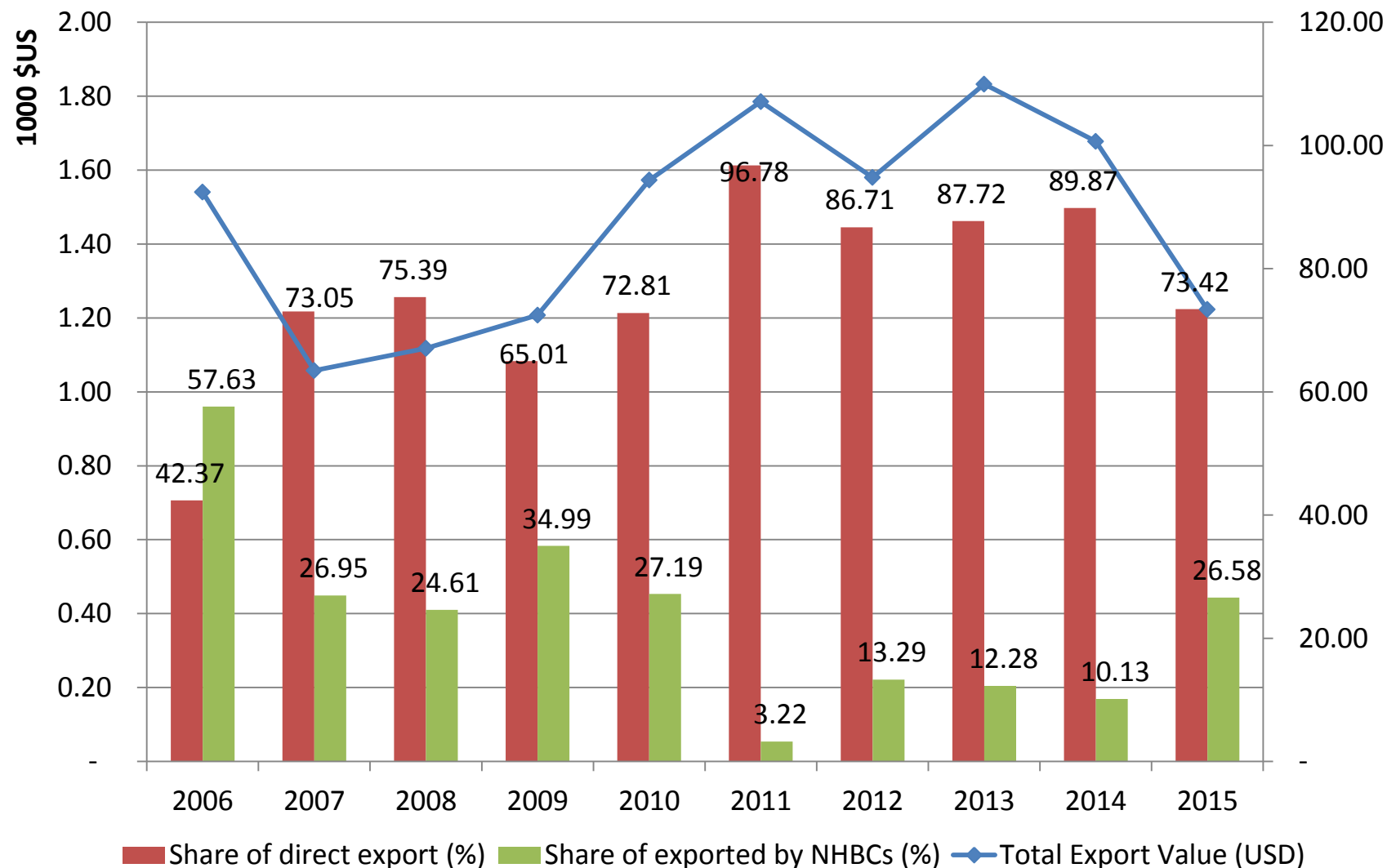
3.4.4 Price Structure



Price Index



3.4.5 Export Value



3.4.6 Productivities comparison between Benzoin, Rice and Maize

Compared factor input and products					
	Unit	Benzoin N=149	Rice N=149	Miaze N=15	Note
1 Labors (days)		35	271.4	112.5	
1.1 Slash	Ha		27	10	
1.2 Burn	Ha		1.3	1	
1.3 Clean	Ha		13	5	
1.4 Planted/replanting	Ha	8.1	28	15	
1.5 weeding	Ha		161	37.5	
1.6 tapping	Ha	14			
1.7 harvest	Ha	12.8	18.1	20	
1.8 Winnow			8		
1.9 Cleaning		0.08			
1.10 Transport		1.2	15	20	
1.11 Extra labor				4	
2 Factor input (amount) Kip		58,000	166,000	493,000	
2.1 Seed	Kg		111,000	468,000	
2.2 Bag/sack	Issue	8,000			
2.3 other equipment	Issue	50,000	55,000	25,000	
2.4 other factor	Issue				
3 Yield	(Kg/ha)	41.8	2,090	4,200	
4 Local price	(Kip/kg)	70,000	3,000	1,200	

Remark:

Rice seeds = 37 kg x 3,000 kip =110,000 kip

Corn seeds LVN10 = 18 kg x 26,000 kip =468,000 kip

Benzoin Yield Average from 5-20 years old

Cost Benefit comparison between Benzoin, rice and maize

Type	Yield	Benefits per unit (Kip/ha)	Benefits per labor (Kip/person-day)	Remark
Benzoin	41.8 Kg/ha	2,868,000	81,943	Forest Farm
Upland rice	2,090 T/ha	6,104,000	22,491	Cultivated
Maize	4,200 T/ha	4,572,000	40,640	Cultivated

Hire local labor: = 30,000 Kip/person/day

Hire labor in town 50,000 Kip/person/day

Thus, Conserve the rotation of fallow land for Benzoin tapping can replace household income from maize and upland rice, on other hand there is any challenge such as income earn from Benzoin will use to buy rice for household consume.

3.5 Role of Benzoin on Local Economic Development

Characteristic of sample group

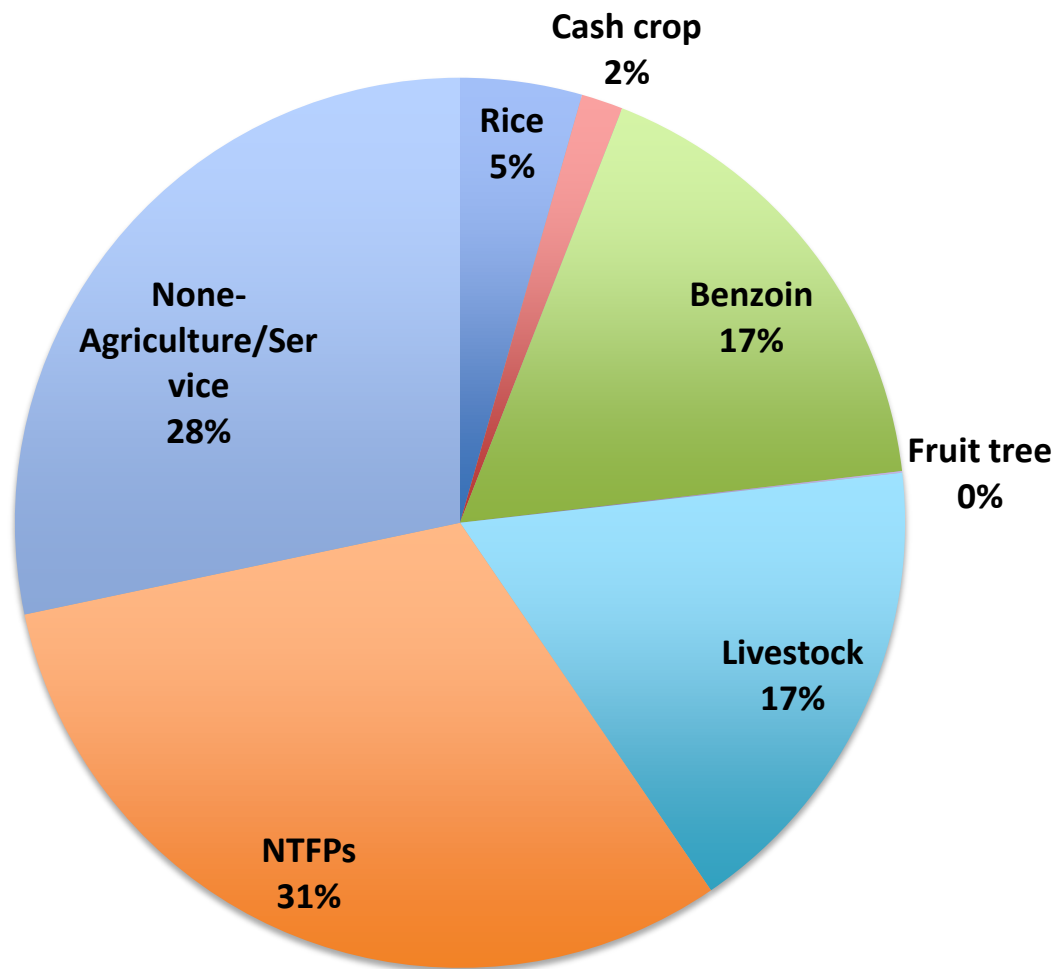
Sample group	Poor	Percentage %	Not poor	Percentage %	Sum
(1) Provinces					
PSL	13	20	52	80	65
HPH	41	41.41	58	58.59	99
LPB	38	64.41	21	35.59	59
Sum	92	41.26	131	58.74	223
(2) Household size (person)					
2-4	6	%	33	%	39
5-7	38	35.19	70	64.81	108
8-10	36	58.06	26	41.94	62
> 10	12	85.71	2	14.29	14
Sum	92	41.26	131	58.74	223
(3) Education					
None school	20	60.61	13	39.39	33
Primary school	61	42.96	81	57.04	142
Secondary school	10	25	30	75	40
High school	1	20	4	80	5
Vocational school	-	-	1	100	1
University (B.Sc)	-	-	2	100	2
Sum	92	41.26	131	58.74	223

Characteristic of sample Group (Cont.)

Not poor household	Obs	Mean	Std. Dev.	Min	Max
Distance: home - main road (Km)	131	14.72	18.31	0	100
Distance: House – Benzoin plantation (Km)	131	3.96	3.56	0	27
Total Agri-Land Area (Ha)	131	4.64	6.47	0.2	63.06
Benzoin products (Kg)	131	28.19	25.13	0	120
Sale Benzoin under contract	131	0.24	0.43	0	1
Training	131	0.07	0.25	0	1
Poor household					
Distance: home - main road (Km)	92	17.49	34.83	0	300
Distance: House – Benzoin plantation (Km)	92	4.05	5.68	0	50
Total Agri-Land Area (Ha)	92	3.81	3.28	0.5	24
Benzoin products (Kg)	92	15.42	20.7	0	130
Sale Benzoin under contract	92	0.26	0.44	0	1
Training	92	0.02	0.15	0	1

3.5.1 Contribution of Benzoin on local livelihood improvement

Proportion of total annual income



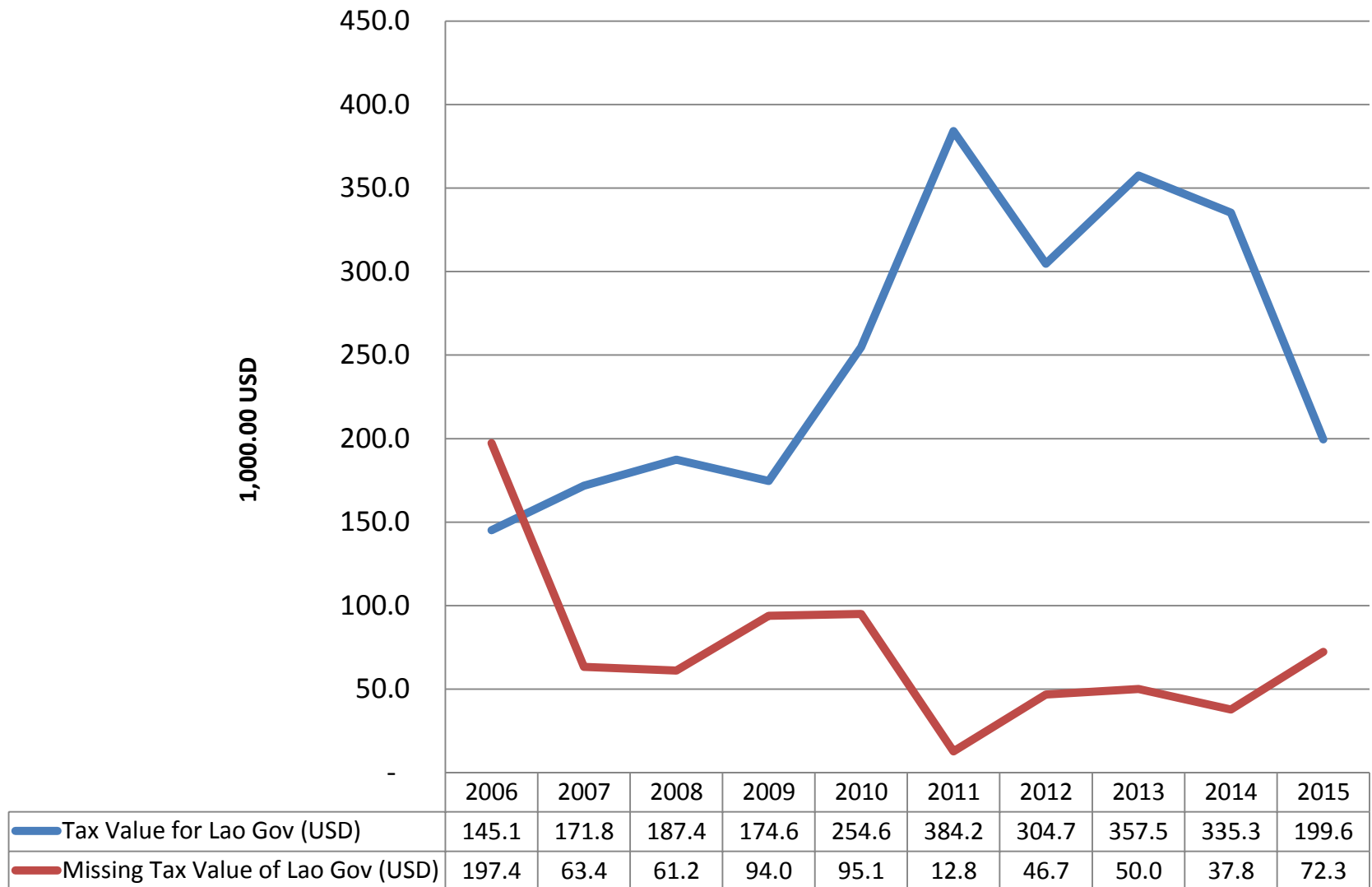
Total annual income: 12,568,000 Kip/household/year

Role of Benzoin on Poverty reduction

VARIABLES	Probit result		OLS results
	Poor/Not poor	Marginal Effects	Revenue Benzoin
Education	-0.190*** -0.048	-0.073*** -0.018	-0.026 -0.05
Farmer's Age	0.109 -0.837	0.042 -0.321	-0.511 -0.936
Household's size	0.267*** -0.052	0.102*** -0.02	0.007 -0.044
Distance btw home to main road	-0.016 -0.061	-0.006 -0.023	-0.003 -0.003
Distance btw home to main benzoin forest	0.034 -0.123	0.013 -0.047	0.001 -0.029
Rice production	-0.725 -0.537	-0.278 -0.206	-
Cultivated area	-0.001 -0.021	0 -0.008	0.02 -0.015
Benzoin product	-0.834*** -0.191	-0.319*** -0.073	1.826*** -0.26
Contact farming	0.449** -0.234	0.175** -0.091	0.818*** -0.213
Training	-0.517 -0.505	-0.179 -0.151	-1.078 -0.681
Constant	1.947 -2.312	-	5.282*** -1.461
Huaphan Province	-	-	-1.244***
			-0.284
Phonsaly Province	-	-	-0.129
			-0.229
Observations	223	-	223
Pseudo R ²	24.88	-	49.77

- Education skill is play important role to poverty reduction of local people in 3 provinces. In General, if head of household have education skill increased by 10% results poverty rate decrease 0.7% ($P < 0.1$)
- Big household with more member cause demand more resource and increase expenditure and poverty rate increase.
- Benzoin is play significant role to reduce local livelihood poverty in remote area, if Benzoin products increase 10% results household poverty decrease 3.19%.
- Sale Benzoin under contract farming is a main factor to ensure sustainable HH income generation when compared with other model because farmer have sustain market, The purchase price is reasonable and people will be stabilized
- OLS model is found that increase benzoin products 10% resulted HH income increase 18.2% in average, And also selling product under contract farming is increase 0.81% when compared with other model.

3.5.1 Role of Benzoin on Gov. income via Tax



Facing problem in Benzoin produce and trade

Benzoin production Problem	PSL	HPH	LPB	Sum
1. Yield is not matched season	2.89	2.24	2.29	2.45
2. Low quality	1.98	1.71	1.66	1.77
3. Lack of technical service of Gov and stakeholder	3.44	2.89	2.43	2.93
4. Farmer could not grow Benzoin tree	2.73	2.61	1.86	2.45
5. Production from Benzoin farm is enough for market demand	3.05	2.75	2.71	2.82
6. Lack of investment cost	2.8	2.89	2.22	2.68
7. Access the financial service is limited	2.94	2.7	2.1	2.61

Note: 1=less to 5 = highest

<u>Marketing problem</u>	PSL	HPH	LPB	Sum
1. Low price	2.97	2.28	2.31	2.49
2. Not ensure market	2.82	2.54	2.38	2.58
3. High tax	1.67	1.59	1.64	1.62
4. Trader get low price	2.9	2.87	2.59	2.8
5. High transport value	2.06	1.65	1.67	1.78
6. Lack of Marketing information	3.48	3.13	3.05	3.21
7. Packing and trading logo	2.4	2.76	2.39	2.55

Note: 1=less to 5 = highest

3.6 Analyze SWOT

Strengths	Weaknesses
<ul style="list-style-type: none"> • Benzoin tree is produced resin zone in 5 upland northern provinces of Laos only and high quality. • Local people have a great local knowledge on benzoin production. • Benzoin farm establishment is low cost • Local people base on shifting cultivation, Benzoin production can provide cash income to their HH. • If all stakeholder is supported seriously to promote Benzoin production, it would be a main come source. 	<ul style="list-style-type: none"> • the <i>Styrax tonkinensis</i> distribution area is not yet identify and zoning clearly. • Benzoin production area decrease. • Benzoin tree is grown in their own ecology zone, but not sure yield performance. • Shifting cultivation cycle below 7 years is risk to disappear Benzoin in some location. • Local people sell benzoin products is not group. • Price is not the same line in each villages • Almost Benzoin production is exported as a law material.
Opportunities)	Treats)
<ul style="list-style-type: none"> • Higher demand from EU market • Sustainable price and increase • Sustainable Benzoin production is base on shifting cultivation cycle, if cycle is expected more than 15 years. • Promoter/company is contributed their own fund to support local education. • Available production and trading group model 	<ul style="list-style-type: none"> • Lack of technical service from Gov. and other stake holder in regard with silviculture techniques. • Broker mixed some stones into benzoin product, purpose to gain more benefit. • Documentary for export is faced slowly process. • Local people have many options in agriculture activities. • Lack of young labor to produce benzoin continually. • Tax and service is charged high rate. • Lack of Price, Marketing information. • There are illegal trade results Gov missing tax value.

IV. Conclusion and Policies recommendation

4.1. Conclusion

- Benzoin tree is a resource require specific microclimate, which is distributed in 5 upland Northern province (HPH, XKH, LPB, PLS, ODX) of Laos. Cover 17 districts, 240 villages there area total area of 1.92 million ha.
- Current Benzoin production is mainly in 3 provinces, 11 district, 184 villages, there are total area 5,307 ha.
- BPA can expand into five provinces within their own eco-zone (except the area cover by three forest categories) at 1-2%of DA, Thus expand area is of 13 thousand Ha to 26 thousand Ha in future.
- Benzoin production is relating to shifting cultivation cycle and Local people have a great local knowledge on benzoin production.

4.1. conclusion (cont.)

- Productivities is of 203 g/tree (immature tree 5-7 years old is of 160 g/t. Production per ha is depend on number of tapped tree.
- In the duration of 2006-2015, Benzoin production is equal 422.19 ton with an average is of 48.19 ton/y.
- Export value within 10 years round is 14.59 million USD with an average 1.46 million USD/y.
- High demand from EU Market, good price. It can earn income for local people about 2,163,000 kip/hh/y, share 17%of hh income.
- Benzoin is contributed to Gov within 10 y round equal 2.5 million USD with an average is 0.25 million USD/y

4.2. Policies recommendation

(1) Techniques/Production system.

- Identify and zoning suitable Land for Benzoin production.
- Develop the best practice of Benzoin production.
- Certify the Geography Index for Lao Benzoin.
- Develop the Benzoin production guideline base shifting cultivation cycle.
- Research on specific microclimate that be affected to quantity of benzoin resin/ yield performance.

4.2. Policies recommendation (cont.)

(2) Marketing

- Gov. (relevant sector) should be promote benzoin production via group (Establish the Benzoin production and Market Group)
- Gov. should be defined central price in every year through fair argument with trader or stakeholder.
- Gov. should be collaborated with all stakeholder to manage benzoin buying and selling.
- Gov. should be find out the best way on how to processing benzoin to instant products for export.

4.2. Policies recommendation (cont.)

(3) Policies support.

- Gov. should be considered to change Benzoin product as NTFPs become to Agriculture products for added value at farmer/collector level.
- Strength collaboration between all stakeholder relating to Benzoin production such as Grading, Packing and Processing.
- Develop specific project of benzoin products and processing.

Thank you very much

Questions and Comments