Lao People Democratic Republic
Peace Independence Democracy Unity Prosperity
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REPORT

Improving Statistics Data on Food Processing and Distribution related to agricultural crop (Rice) in Savannakhet, Lao PDR

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Center for Agricultural Statistics
Department of Planning and Cooperation
Minstry of Agriculture and Forestry
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Contents

I. Introduction:

To Support Five year development plan on Agriculture sector and Food Security that need Accuracy and Reliable data on Food Value Chain (FVC) from Farmer(producer) to Consumer.

Plans to develop agriculture and forestry, ensuring food security and promoting commercial products have clear and complete information. Therefore, the Department has organized and co-operating Survey statistics chain, manufacturing and distributing traffic from farmer to consumer. Survey above these are supported financially and technical by government of Japan through the Secretariat systems guarantee food ASEAN or (AFSIS).

In the past, Agriculture Sector just only made collect statistics on production data such as Planted Area, Harvested Area, Production and yield. Now so we need data on (FVC) such as cost production, lost harvest, price, domestics use, stock, and seed and so on.

Between
The ASEAN Food Security Information System (AFSIS)
And
Department of Planning and Cooperation(DOPC), Ministry of Agriculture and Forestry, Lao PDR
On 21 July 2016

II. Main Objective:

1) To collect cost production and income of farmers, traders and entrepreneurs (rice miller, processing and etc);

2) To collect distribution chain from producer to consumer;
3) To collect characteristics of farmers, traders and entrepreneurs and other income (Exclude Rice).

III. EXPECTED RESULTS

3.1. Impact

The project will contribute to ensure the food security in ASEAN region through enhancing establish of FVC under the more effective evidence based policies and programmes.

3.2. Outcome

The main objective of the project is to develop new methods for gathering food processing and distribution data related to agricultural crops, and to introduce the methods into ASEAN member states through capacity building of agricultural statistics authorities in member states.

3.3. Outputs and Activities

Output 1. Appropriate statistical method for new survey on the FVC related to agricultural crops is developed. The method is tried in selected pilot countries to identify and improve issues. The regional workshop is organized to share important role of building the FVC in ASEAN region and the necessity of developing related data for policy makers. Officers of user and holder on these data and relevant private companies are gathered to discuss necessary data to develop in ASEAN region.

AFSIS expert will make a standard manual for developing a list of the target population such as agribusiness companies for a pilot survey at selected pilot countries. Pilot countries develop respective sampling frames in consultation with AFSIS expert.

The pilot countries conduct a trial survey in a limited area such as a province using introduced survey method which is developed by AFSIS expert to clarify improvement point and/or constrains on new method.

Activity 1.1 Japanese expert grasps the current data collection situation related to FVC in each ASEAN member state in cooperation from the officers at organizations responsible for agricultural statistics (e.g. Existence of the data collection system on FVC, availability for a sampling frame, implementation status on a data quality control, survey method, data item and needs for FVC related data).

Activity 1.2 Regional workshop is organized to review existing data on FVC in ASEAN member states and to collect needs for data user such as policy makers and/or private companies, to identify core datasets which is to be made in this project.

Activity 1.3 AFSIS expert selects candidate survey methods based on the experience of various survey methods implementing in ASEAN member states and Japan. Then the expert discusses with organizations responsible for agricultural statistics in ASEAN region to identify a standard survey method which is to be introduced.

Activity 1.4 AFSIS expert creates a standard manual for developing a list of the target population for conducting a pilot survey using the developed method. Organizations responsible for agricultural statistics in selected pilot countries (two per year) identify organizations concerned which have an available list used for creating the list of target population on a new survey, as necessary, a technical assistance or an advice is provided by the expert.

Activity 1.5 AFSIS expert designs the trial survey for collecting the necessary data at various stages on the FVC and prepare materials for the trial survey which are manuals (for survey preparation, implementation, data entry and validation, scrutiny and tabulation), questionnaire and processing program (for selecting a sample automatically from a sample frame, data validation, aggregation and tabulation).

Activity 1.6 Pilot countries carries out the trial survey which is including all its stages such as a selecting sample, collecting data, entering and validating data, aggregating and tabulating data, scrutinizing results. After finishing all activities on the trial survey, they review an improvement point on all operations of survey and summarize them.

Output 2. The new survey improved based on the results from trial surveys is disseminated into all ASEAN member states.

AFSIS expert improves the survey method and materials to solve issues which are identified at the trial survey in the pilot countries. Then Expert disseminates improved method into ASEAN members through training workshops. Then ASEAN members conduct new survey by themselves periodically using introduced method.

AFSIS expert prepares the processing programs such as tabulation, checking error and printing statistics tables in line with the obtained knowledge from the trial survey.

A regional workshop is organized for sharing knowledge from trial survey and training on new survey method to disseminate a new survey into other ASEAN member states. The in-country training is carried out at the initiative of each member state. AFSIS expert joins the training to give an advice, if necessary.

Officers in each country make a plan to conduct the new survey in consideration with their available resources. Then, new survey is carried out step by step.

Activity 2.1 AFSIS expert improves survey materials based on the experiences from trial survey and finalize its English version (ex. manuals and questionnaires). Then AFSIS expert creates specification documents for commissioned translation from English to each ASEAN countries language. After translation, officer in ASEAN member states checks the translated materials. (Or Officers in ASEAN member states translate all materials into their mother language by themselves, if they request.)

Activity 2.2 AFSIS expert creates specification documents for programs for processing of the data collected. (Or AFSIS expert creates all processing systems by using an application soft like Excel, if there is a budget constraint.) All programs are checked whether or not in line with the design of improved survey.

Activity 2.3 At the regional workshop, AFSIS expert makes a lecture how to conduct and manage the new survey in training session. Representatives from the pilot countries explain important points to implement the survey especially at the stage of data collection in light of their experiences from the trial survey.

Activity 2.4 Countries excluding the pilot countries create a list of target population for the sampling survey in consultation with related organizations. All member countries select survey targets from the list and conduct the survey for data collection through a mail or enumerator. Collected data is checked, scrutinized and used to estimate.

Output 3. Results from new survey in all member states are published through AFSIS web site

All stakeholders such as public and/or private sectors are able to get all relevant data on the FVC through AFSIS web site.

Activity 3.1 AFSIS web site is rebuilt in order to providing the new data on the FVC.

Activity 3.2 All member countries send data on results of survey to AFSIS secretariat. AFSIS secretariat sum up the all received data for making the results of ASEAN region and enter the results on each country and ASEAN region into AFSIS web site.

Activity 3.3 AFSIS Secretariat creates a final report on the project to submit to MAFF Japan.

IV. Durations and targets of Project

4.1. Duration: July 2016 to March 2017

1. Planning and designing, Questionnaires and Manual

2. Pilot survey: November 2016

3. Update method, Questionnaire, Manual: Nov. 2016

4. Training: December 2016

5. Survey: December 2016

6. Analysis: January- February 2017

7. Workshop: March 2017

+ Date For training and enumeration

- Training enumerators on 5-6 December 2016 at Savannakhet PAFO.

- Field Survey on 8-20 December 2016(15 days).

- On 21 December 2016, Enumerators must to send all questionnaires to PAFO supervisors.

- On 22 December 2016, PAFO supervisors must to send all questionnaires to CAS.

+ Number of enumerator and suppervisors

- Center supervisors from CAS, DOA, NAFRI, DaLAM, NOUL, MOIC

- 2 PAFO supervisors from (Savannakhet PAFO and POICOs)

- 30 Enumerators (15 DAFOs and POICOs)

4.2. Targets of Project

Target Place: Savannakhet Province, Because Savannakhet Province is on target province of 10 provinces on Five year development plan on Agriculture sector and Food Security**,** and there have many companies, Factories and Manufactures to processing rice. So Savannakhet is the most suitable province to conduct FVC on rice.

Target Crop: Rice **is the main food in Laos,** The staple food of the Lao is steamed sticky rice, which is eaten by hand. In fact, the Lao eat more sticky rice than any other people in the world**.**

Target Statistical Unit: Farmer, Middleman, Rice miller, Noodle powder maker, Noodle maker, Rice Cake maker and Rice brewery.

V. Project organization

Center for Agricultural Statistics, Department of Planning and Cooperation MAF is the core conduct the survey with:

- Department of Agriculture, MAF

- Department of land Management and Development , MAF;

- National Agriculture and Forestry Research Institute, MAF

- Department of Planning, MOIC,

- Department of Extension and Development , MOIC;

- Lao National Statistics Bureau (LSB), MPI;

- National University of Lao;

- Savannakhet Province (PAFO, DAFO, POIC and DOIC)

VI. Budget

Totoal budget is 52,500 USD, supported by Japan Goverment and AFSIS. detail as below:

Salary of National Consultant	7,000 USD
List Frame Process	5,000 USD
Travel Cost	5,300 USD
Investigation Meeting	3,700 USD
Enumerator Meeting and Pilot Survey	21,400 USD
In-country Workshop	4,600 USD
Manual Interpretation and print	2,500 USD
Management of DoPC	3,000 USD
Total	52,500 USD

VII. Implementation

| No.	Activities	2016						2017		
		7	8	9	10	11	12	1	2	3
1	Complete information of list condition on food and agriculture related companies in the country into specified form called "survey sheet for list condition.	➡								
2	Submit the completed survey sheet to AFSIS expert by the middle of July in 2016;	➡								
3	Participate in the First regional workshop held in Bangkok in the beginning of August to share the objective of the project and identify needed data from food and agriculture related company		➡							
4	Consult with AFSIS expert after First regional workshop about specification of list by using for sampling frame		➡							
5	Consult with institution(s) concern about the specification of list to analysis its feasibility and make it as a final draft in August of 20160.		➡							
6	Obtain a needed list from institution(s) concern and process it in September of 2016 and submit it to AFSIS expert;				➡					
7	Prepare an In-country investigation meeting for relevant stakeholder such as policymakers and data holders (public and private) in October of 2016 to share the project objective and its outcome, to grasp country specific needs of FVC related data and to discuss appropriate survey methods;				➡					
8	Participate in the Investigation meeting to introduce the objective of the project and facilitate discussion as an Emcee					➡				
9	Prepare the Pilot survey enumerator meeting with DoPC to familiarize the survey concept, sampling methods, data collection , quality control and data processing in December of 2016					➡				
10	Hold the Pilot survey enumerator meeting to explain the objective of the survey and how to collect, scrutinize and aggregate data as a supervisor of pilot survey						➡			

11	Conduct the Pilot survey and examine the issues for improvement as a supervisor in December of 2016						→			
12	Checking, Data entry, cleaning and Data processing						→			
13	Prepare the In-country workshop with DoPC in February of 2017 to discuss the results of pilot survey							→		
14	Participate in the In-country workshop to finalize the issues and identify its countermeasures as the emcee								→	
15	Participate in the Second regional workshop held in Bangkok in March of 2017 to make a presentation on the results of the pilot survey and to discuss how to improve the survey method.									→

VIII. Methodology and Sample size

8.1. Methodology:

1. Using the principles of statistical Coefficient of Variation (CV) 10%,
2. Systematic Random Sampling (SRS)
3. List Frame as:

- Rice farmers: from Lao Agricultural Census II, 2010/11. Select 200 sample households by using Systematic Random Sampling (SRS)

- Rice entrepreneurs: Listing frame from Department of Registered enterprises, Ministry of Industry and Commerce. Select 170 Sample by using Cluster Systematic Random Sampling (cluster-SRS)

- Middleman: We prepare the list of middleman by asking farmers, then we do interview directly Interview 30 middlemen from the our target (2 middlemen/District)

Figure1: Flow on Food value chain
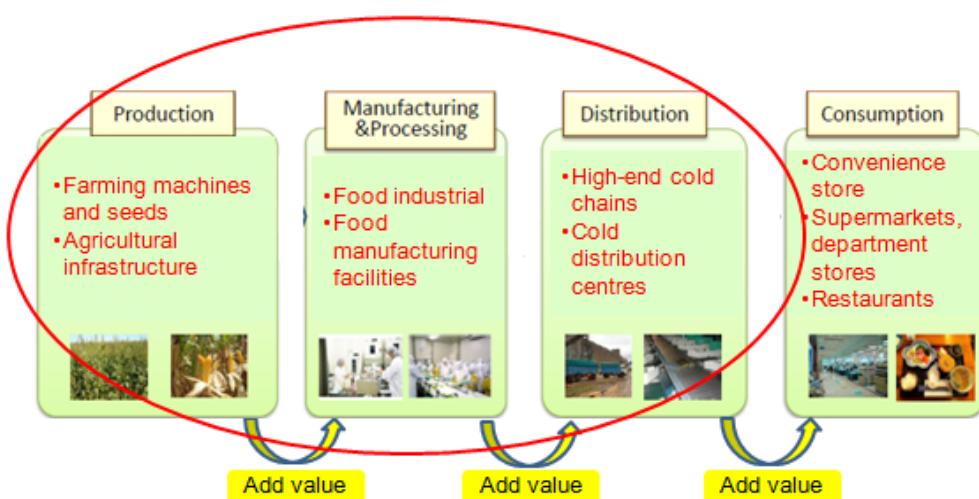
8.2. Sample size

8.2.1. Calculation Sample size:

Based on the latest Agricultural Census 2010/11 total is 106,533 Wet season rice HHs and Rice Milling Factories from MOIC total is 1880 Factories,

1. **Precision of Sample Size by The role of SD**

1.1. **The standard deviation of an entire population is known as σ (sigma) and is calculated using:**

$$\sigma = \sqrt{\frac{\sum (x - \mu)^2}{N}}$$

Rice Milling Factories SD= 46.1 and Mean = 134.3

Wet season rice HHs SD= 2609.7 and Mean = 7,166

Where **x** represents each value in the population, **μ** is the mean value of the population, **Σ** is the summation (or total), and **N** is the number of values in the population.

1.2. The **standard error** of the mean is designated as: σ_M. It is the **standard deviation** of the sampling distribution of the mean. The **formula** for the **standard error** of the mean is: ... The **formula** shows that the larger the sample size, the smaller the **standard error** of the mean.

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

Rice Milling Factories SE= 13.3

Wet season rice HHs SE= 753.4

Where **x** represents each value in the population, **x** is the mean value of the sample, **Σ** is the summation (or total), and **n-1** is the number of values in the sample minus 1.

1.3.   **Formulas to calculate coefficient of variation:**

The formula to find the sample mean

$$\mu = \frac{\sum x}{n}$$

Formula to calculate sample standard deviation

$$\sigma = \sqrt{\frac{\sum (x - \mu)^2}{n - 1}}$$

Formula to calculate **coefficient of variation**

$$CV = \frac{\sigma}{\mu}$$

Therefore, the resultant value of this formula **CV = (Standard Deviation (σ) / Mean (μ))** will be multiplied by 100. CV is important in the field of probability & statistics to **measure the relative variability** of the data sets on a ratio scale. In probability theory and statistics, it is also known as unitized risk or the variance coefficient.

Rice Milling Factories CV= (134.3/13.3)*100 = 10%

Wet season rice HHs CV= (7166/753.4)*100 = 10%

1.4.   Calculate Sample size or Sample number for this survey

Determining sample size is a very important issue because samples that are too large may waste time, resources and money, while samples that are too small may lead to inaccurate results. In many cases, we can easily determine the minimum sample size needed to estimate a process parameter, such as the population mean μ.

When sample data is collected and the sample mean $\bar{x}$ is calculated, that sample mean is typically different from the population mean μ. This difference between the sample and population means can be thought of as an error. The margin of error E is the maximum difference between the observed sample mean $\bar{x}$ and the true value of the population mean μ

$\mathrm{E} = z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$ where:

- $z_{\alpha/2}$ is known as the critical value, the positive z value that is at the vertical boundary for the area of $\alpha/2$ in the right tail of the standard normal distribution.
- σ is the population standard deviation.
- n is the sample size.
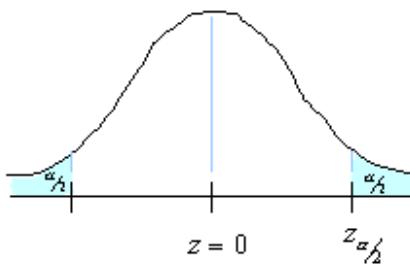
Rearranging this formula, we can solve for the sample size necessary to produce results accurate to a specified confidence and margin of error.

$$n = \left[\frac{z_{\alpha/2}\,\sigma}{E} \right]^{2}$$

This formula can be used when you know σ and want to determine the sample size necessary to establish, with a confidence of $1-\alpha$, the mean value μ to within $\pm E$. You can still use this formula if you don't know your population standard deviation σ and you have a small sample size. Although it's unlikely that you know σ when the population mean is not known, you may be able to determine σ from a similar process or from a pilot test/simulation.

Let's put all this statistical mumbo-jumbo to work. Take for example that we would like to start an Internet service provider (ISP) and need to estimate the average Internet usage of households in one week for our business plan and model.

Problem
We would like to start an ISP and need to estimate the average Internet usage of households in one week for our business plan and model. How many households must we randomly select to be 95 percent sure that the sample mean is within 1 minute of the population mean μ. Assume that a previous survey of household usage has shown $\sigma = 6.95$ minutes.

Solution
We are solving for the sample size n.

A 95% degree confidence corresponds to $\alpha = 0.05$. Each of the shaded tails in the following figure has an area of $\alpha/2 = 0.025$. The region to the left of $z_{\alpha/2}$ and to the right of $z = 0$ is 0.5 – 0.025, or 0.475. In the table of the standard normal (z) distribution, an area of 0.475 corresponds to a z value of 1.96. The critical value is therefore $z_{\alpha/2} = 1.96$.

The margin of error $E = 1$ and the standard deviation $\sigma = 6.95$. Using the formula for sample size, we can calculate n:

$$n = \left[\frac{z_{\alpha/2}\sigma}{E}\right]^2 = \left[\frac{1.96 \cdot 6.95}{1}\right]^2 = [13.62]^2 = 185.55 = 186$$

So we will need to sample at least 186 (rounded up) randomly selected households. With this sample we will be 95 percent confident that the sample mean $\bar{x}$ will be within 1 minute of the true population of Internet usage.

$$n = \left[\frac{z_{\alpha/2}\sigma}{E}\right]^2$$

This formula can be used when you know σ and want to determine the sample size necessary to establish, with a confidence of $1-\alpha$, the mean value μ to within $\pm E$. You can still use this formula if you don't know your population standard deviation σ and you have a small sample size. Although it is unlikely that you know σ when the population mean is not known, you may be able to determine σ from a similar process or from a pilot test/simulation

Finally:

Total Sample number of Rice Milling Factories:

n= ((SD^2/((Mean n1+n2…*0.1)*(Mean n1+n2…*0.1))*N target Districts)=165 ≤ 170

n= 170

Total Sample number of Wet season rice HHs:

n= ((SD^2/((Mean n1+n2…*0.1)*(Mean n1+n2…*0.1))*N target Districts)=199 ≤ 200

n= 200

8.2.2. Selection Sample by SRS

Based on the latest Agricultural Census 2010/11 and Rice Milling Factories from MOIC, the list of SRS will be establish as the sampling frame for selecting the Primary Sampling Unit (PSU). The target PSUs are only those **rice-growing Wet season** with **expected harvest** during the last period and list of rice milling in 2015-2016.

1. Selection of sample (Primary Sampling Unit: PSU)
    The sample enumeration areas are selected from the Savannaket Province by Systematic Random Sampling (SRS).

By Systematic Random Sampling (SRS)

The following is the procedure to select PSU with SRS method:

1. Select (200) Sample in Savanakhet Province for Interview

a) List the Primary Sampling Units [PSU: and count the total number of PSU in the domain (**Savanakhet Province**), which is denoted by "M";

b) Determine the total number of PSU to be sampled, which is denoted by "d";

c) Divide the total number of PSU by "d" to get the Sampling Interval (SI);

d) Run Excel function @RANDBETWEEN(1;SI), which has been entered. By the function, a random number between 1 to SI will appear. It is the Random Start (RS), and insert "Check" symbol in the correspoding row;

e) Calculate the following series: RS; RS + SI; RS + 2SI; ….…… RS+(d-1)×SI,

IX. Steps for conduct field survey

After training completed back to their office to prepare Notice and check all sample number that supervisor gave to enumerators: we divide in 2 teams per districts: Team 1: Enumerators from DAFOs interview Farm households and Team 2: Enumerator from DOICO interview Middle mane and Entrepreneurs.

- First Step: go to head of Village explain our objective and show notice to them to know why we come here that help and support for our survey.

- Next step: finding sample household, Middle mane and Entrepreneurs and interview them.

- Before go to interview they must divide time clearly.

- When finished interview the enumerator must to check all items completed or not.

- They have to report the progress to their supervisors immediately if they have problem of not understand.

- They should complete on time and send all questionnaires to their supervisors.

X. Definition

A value chain is a set of activities that a firm operating in a specific industry performs in order to deliver a valuable <u>product</u> or <u>service</u> for the <u>market</u>. The concept comes through business management and was first described by <u>Michael Porter</u> in his 1985 best-seller, *Competitive Advantage: Creating and Sustaining Superior Performance.*

The idea of the value chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs. Inputs, transformation processes, and outputs involve the acquisition and consumption of resources – money, labour, materials, equipment, buildings, land, administration and management. How value chain activities are carried out determines costs and affects profits.

Value added is offering additional features with goods or services.

Value added may also refer to:

- Value-added tax, a tax based on gross profits (the difference between the cost of goods sold and the selling price)
- Value-added modeling, a method of teacher evaluation that attempts to identify how much student achievement is due to the teacher
- Value-added reseller, a company that adds features to an existing product, then resells it, usually to end-users
- Value-added service, extra services in the telecommunications industry
- Value-added network, a hosted service offering that acts as an intermediary between business partners
- Value-added theory, or *social strain theory*
- Value-added agriculture, manufacturing processes that increase the value of primary agricultural commodities
  - Value-Added Producer Grants, a US program to promote the development and marketing of value-added agricultural products
- Value chain or value-added chain, the set of activities performed by a firm to create a product or service of value

Income is the consumption and savings opportunity gained by an entity within a specified timeframe, which is generally expressed in monetary terms. However, for households and individuals, "income is the sum of all the wages, salaries, profits, interests payments, rents, and other forms of earnings received... in a given period of time."

Net income can be distributed among holders of common stock as a dividend or held by the firm as an addition to retained earnings. As profit and earnings are used synonymously for income (also depending on UK and US usage), **net earnings** and **net profit** are commonly found as synonyms for net income. Often, the term **income** is substituted for net income, yet this is not preferred due to the possible ambiguity. Net income is informally called the **bottom line** because it is typically found on the last line of a company's income statement (a related term is top line, meaning revenue, which forms the first line of the account statement).

The items deducted will typically include tax expense, financing expense (interest expense), and minority interest. Likewise, preferred stock dividends will be subtracted too, though they are not an expense. For a merchandising company, subtracted costs may be the cost of goods sold, sales discounts, and sales returns and allowances. For a product company advertising, manufacturing, and design and development costs are included.

XI. Survey Results

Accoding to Many technical meeting on Analyzing the data from the rice FVC Survey result, the latest technical meeting is on 20 March 2017 at Center for Agricultural statistics Meeting room, there are expert participants on FVC from: Department of Agriculture, Department of land Management and Development, National Agriculture and Forestry Research Institute, Department of Planning and Department of Extension and Development of MOIC and National University of Laos, the detail of Survey result:

*Figure2:* **Flow of FVC on rice in Savannakhet** *Province*
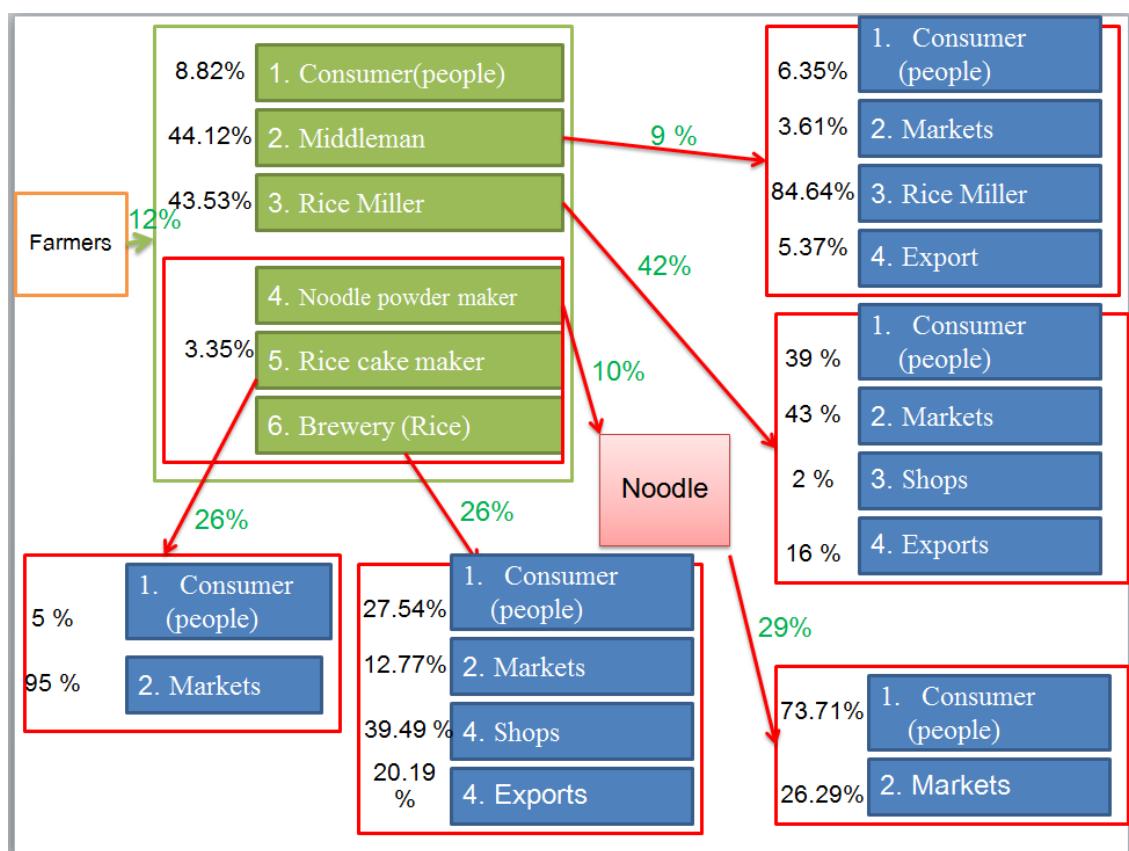
- Base on the figure2 shown that the first rice producer is farmer can produced and sold paddy rice in wet season 2015/16, Average value added is 12%(deducted all capital and cost production from total income). The most paddy rice sold to middle man cover 44.12%, to millers is 43.53%, to consumer (people) is 8.82% and sold to processors(Noodle power maker, Rice cake maker, Brewery(rice)...) is 3.35%.

- Nexts, the middle man bought the paddy rice from the farmers and sold other enterprenuars, Average value added is 9%(deducted all capital and cost production from total income). The most paddy rice sold to millers is cover 84.64%, to consumer (people) is 6.35% and sold to Market is 3.61% and to export is 5.37% (almost export to China and Vietnam).

- For Millers, Average Value added (big, midieum and small millers) is 42%(deducted all capital and cost production from total income). they sold the milling rice to market is cover 43%, to consumer (people) is 39%, to export is 16%(almost export to China, Thailand and Vietnam, For the IDP miller, they export rice to China, Thailand, Gernany and France) and sold to retial shop is cover 2%.

- For Noodle powder maker (one Noodle powder is 20kg) made by white rice, Average value added is 10%(deducted all capital and cost production from total income).

- For Noodle Marker, they bought the Noodle powder and then they produce noodle. Average value added is 29% (deducted all capital and cost production from total income). they sold the Noodles to consumer (people)is cover 73.73%, and sold to Market is cover 26.29%.

- For Rice cake Maker, Average value added is 26% (deducted all capital and cost production from total income), they sold Rice cake to Market is cover 95%, and sold to consumer (people) is cover 5%.

- For Brewery Rice Maker, they bought the broken rice to produce Brewery Rice or white alcohol, Average value added is 26% (deducted all capital and cost production from total income), The most Brewery Rice sold to to retial shop is cover 39.49%, to consumer (people) is 27.54%, export is 20.19%(almost export to Vietnam) and sold to Market is 12.77%.

11.1. Analysis Farmer questionnaires

### Figure3. Head of rice farm household by sex
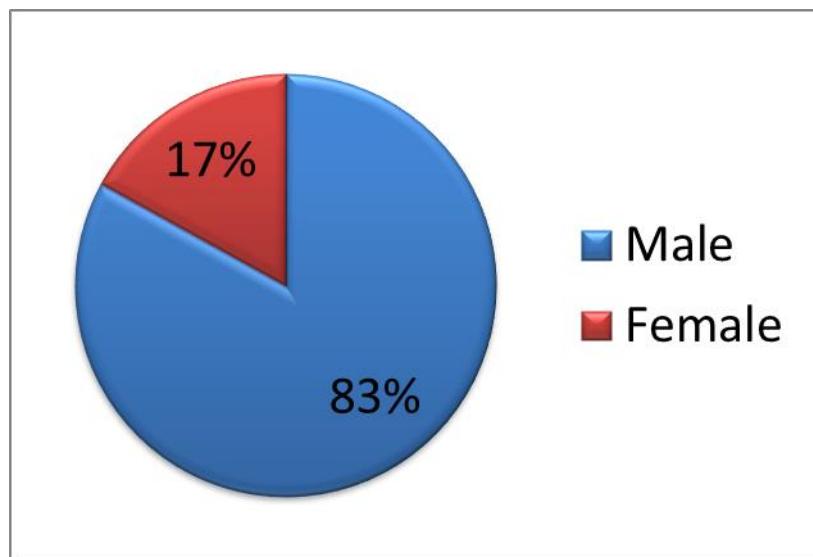
the figure3 shown that almost head rice farm household is male cover 83% and female is 17%.

### Figure4. Education level of head of rice farm household
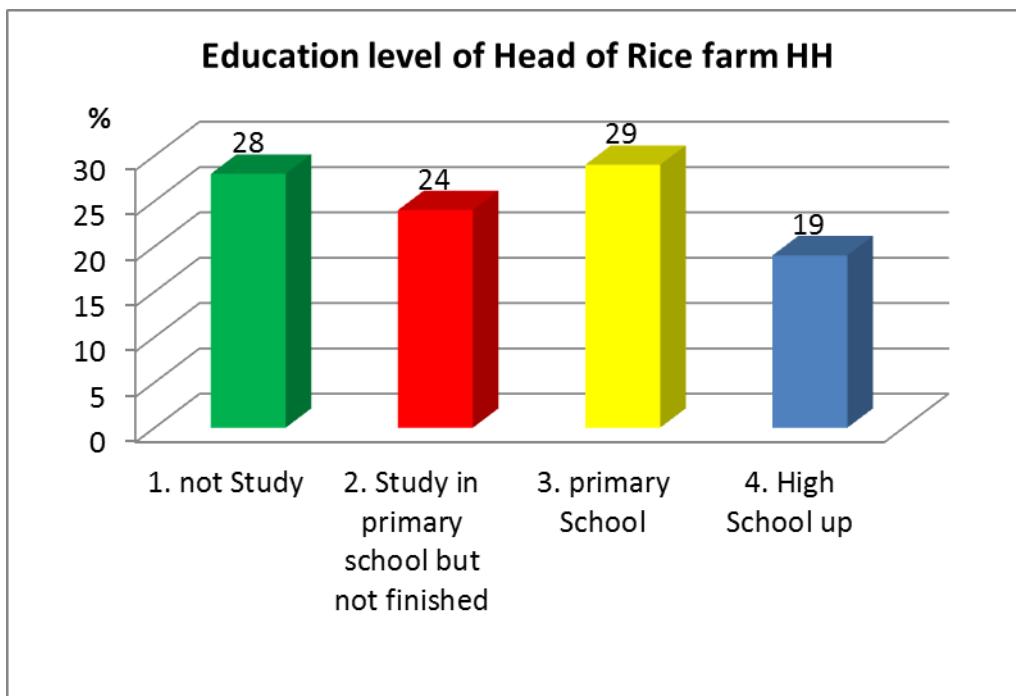
this figure shown that the highest education level of head of rice farm household is mostly primary school cover 29% and second education level is not study 28%.

Figure5. Head of rice farm household by Age

Head of Rice farm HH by Age

36%   34%

30%

■ 20-40   ■ 41-60   ■ 61 up
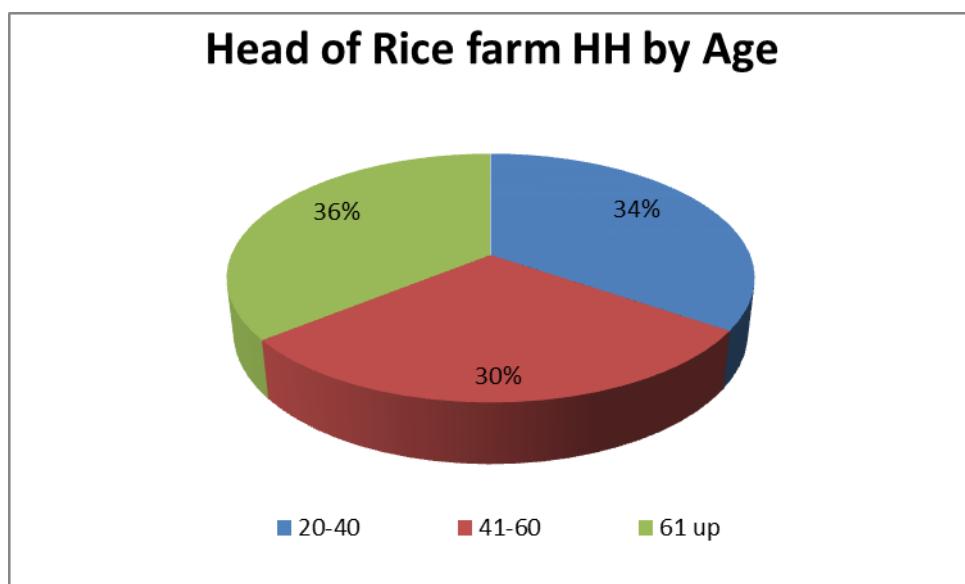
This figure shown that the most age of Head of rice farm household is 6o years olds up cover 58%.

Figure6. Rice farm household size

Rice farm HH Size

%

35
30
25
20
15
10
5
0

4.5   25.5   34   22   14

01-02   03-04   05-06   07-08   09-up
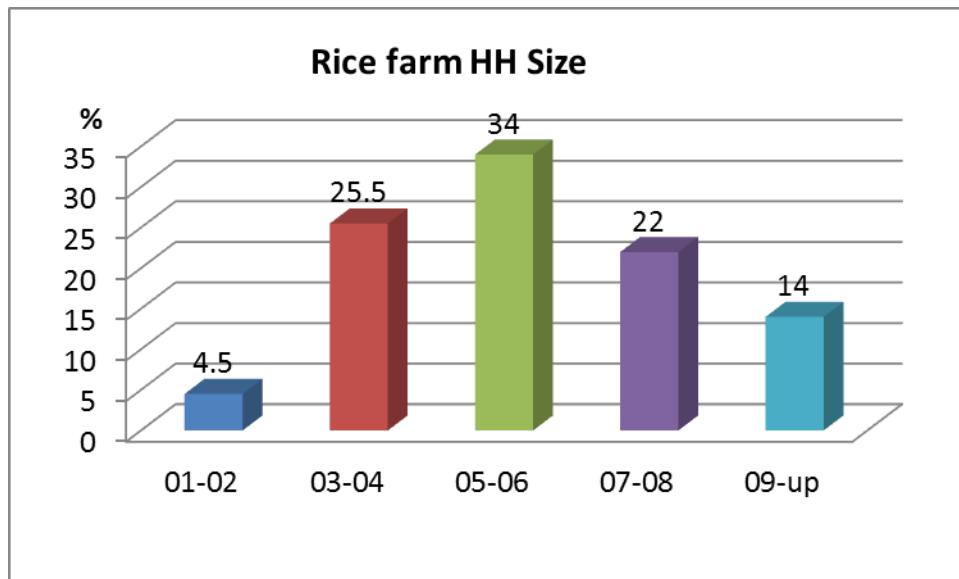
This figure shown that the average of Rice farm household size is 5.89 or between 05-06 persons cover 34%.

Table1. Income from agriculture production (not included rice) of farm HH per year.

Type of income	Kip	Percentage
1. Selling crops (excluded Rice)	5,000,000	39
2. Selling Livestock	6,818,182	62
3. Selling fishery	4,500,000	23

Figure7. Income from agriculture production (not included rice) of farm HH per year
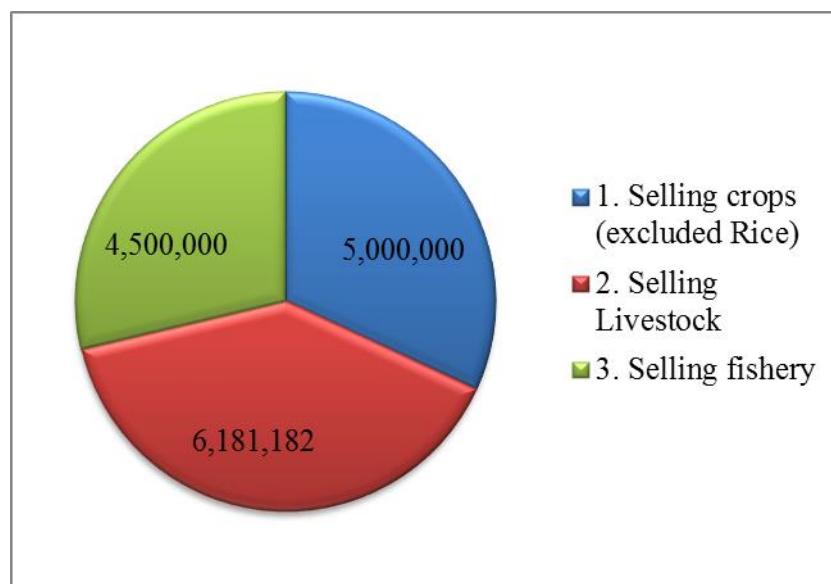
This figure shown that the most Income from agriculture production (not included rice) of farm HH per year is from selling livestock cover 62%.

**Figure8. Size of Agriculture land holding by Rice farm HH**
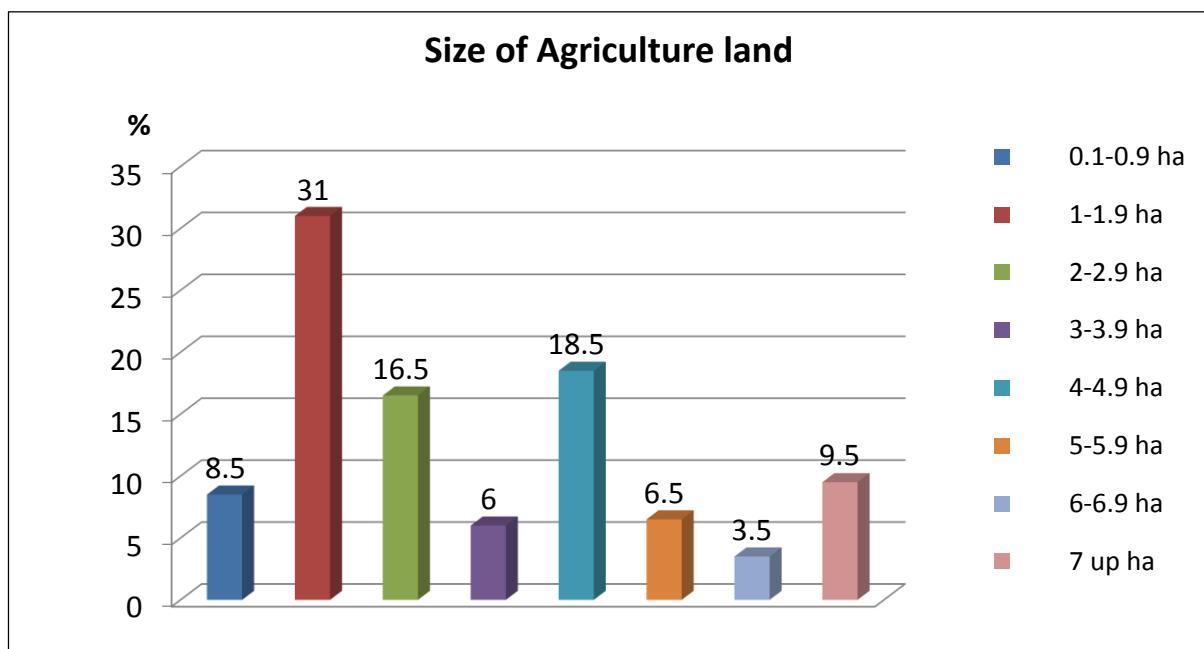
This figure shown that:

- Average agriculture land holding is 4 ha/HH

- Average Rice land holding is 1.5 ha/ HH

**Table2.   Value added of Rice Production from Farmer**

Rice Farmer Activities	Value (Kip/ha)
I. Cost production	***4,271,045***
1. Agriculture inputs	
1.1 Seed	300000
1.2 Fertilizers	660000
2. Labors	
2.1. Land preparation	500,000.00
2.2. Seeding/transplanting	1,200,000.00
2.3. Keeping, cutting grass	107,173.65
2.4. Put Fertilizers	105,586.60
2.5. Harvesting and threshing	1,200,000.00
3. Machinery cost	
3.1 Tractors depreciation	198,284.70
II. Income	***4,841,676***
III. Net income	***570,631***
Value added of operating rice	**Percentage**
Value added= (III/II)x100) or (570,631 / 4,841,676)*100	**12**

the first rice producer is farmer can produced and sold paddy rice in wet season 2015/16, Average value added is 12%(deducted all capital and cost production from total income such as cost agriculture inputs, seed, fertilizer, labors …etc).

Figure9. Rice Production selling by Farmer
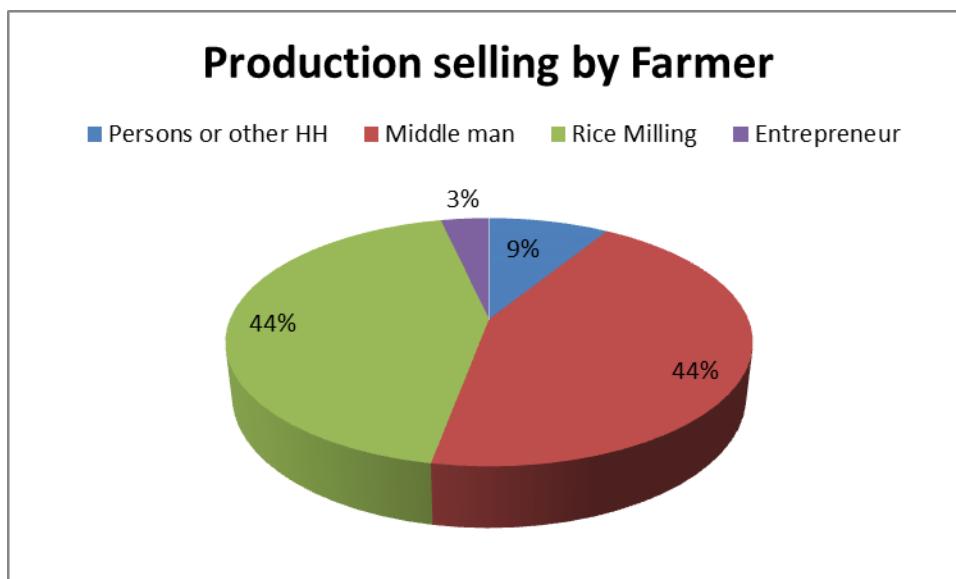
The most paddy rice sold to middle man cover 44.12%, to millers is 43.53%, to consumer (people) is 8.82% and sold to processors(Noodle power maker, Rice cake maker, Brewery(rice)...) is 3.35%.

Figure10. Issues of farmers operating this activities.
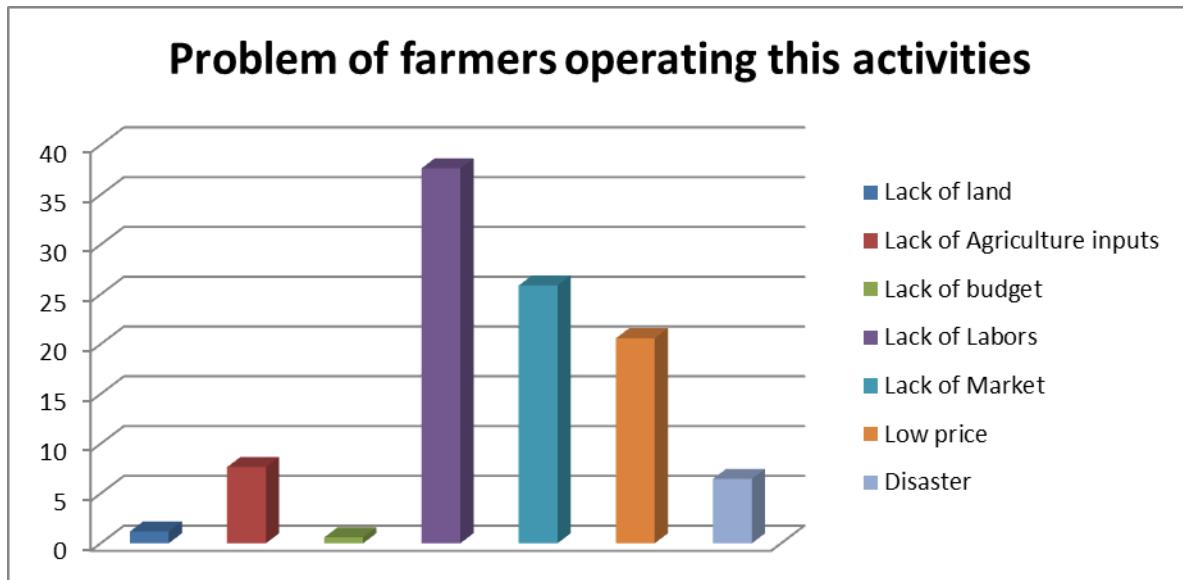
This figure shown that the biggest issues of farmers operating this activities is lack of labors cover 37.65%, second issue is lack of market cover 25.88% and the third issue is Low price that mean **Farmer work other activities, Access to market limited and No standard of price.**

12.2. Analysis Farmer questionnaires

Figure11. Middle man by sex.
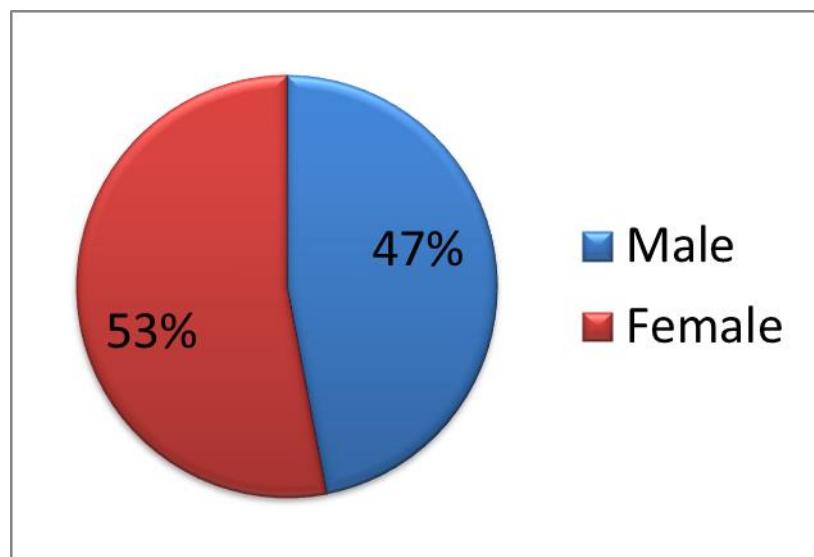
the figure11. shown that almost Middle man is female cover 53% and male is 47%. not so much different.

Figure12. Middle man by Age

Middle man by Age

47%

43%

10%

■ 30-40   ■ 41-50   ■ 51 up
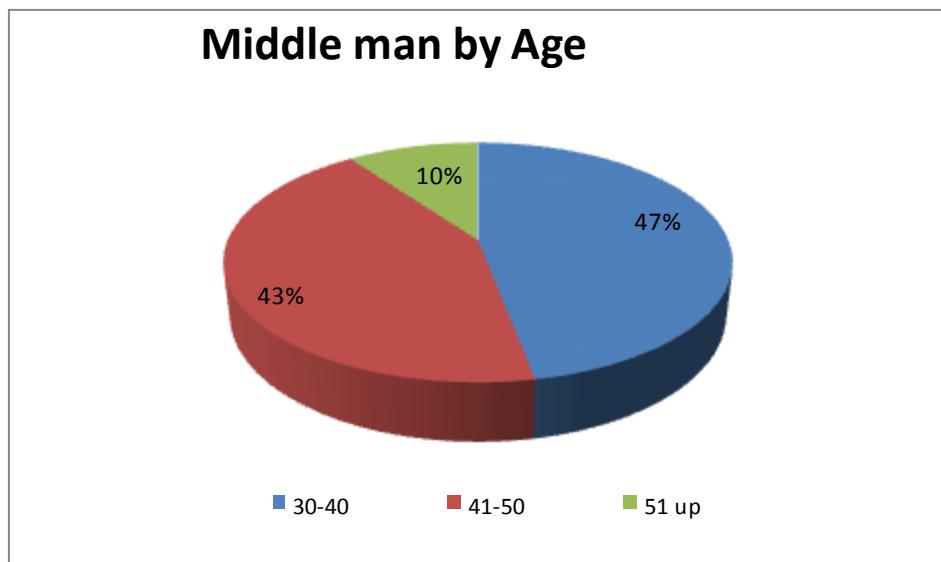
This figure shown that the most age of Middle man is between 41-50 years olds cover 43%.

Figure13. Education of Middle man.

Education level of Middle man

%

50   50
40
30   33
20   13
10   3
0

1. not Study   2. primary school   3. High school   4. Upper High school
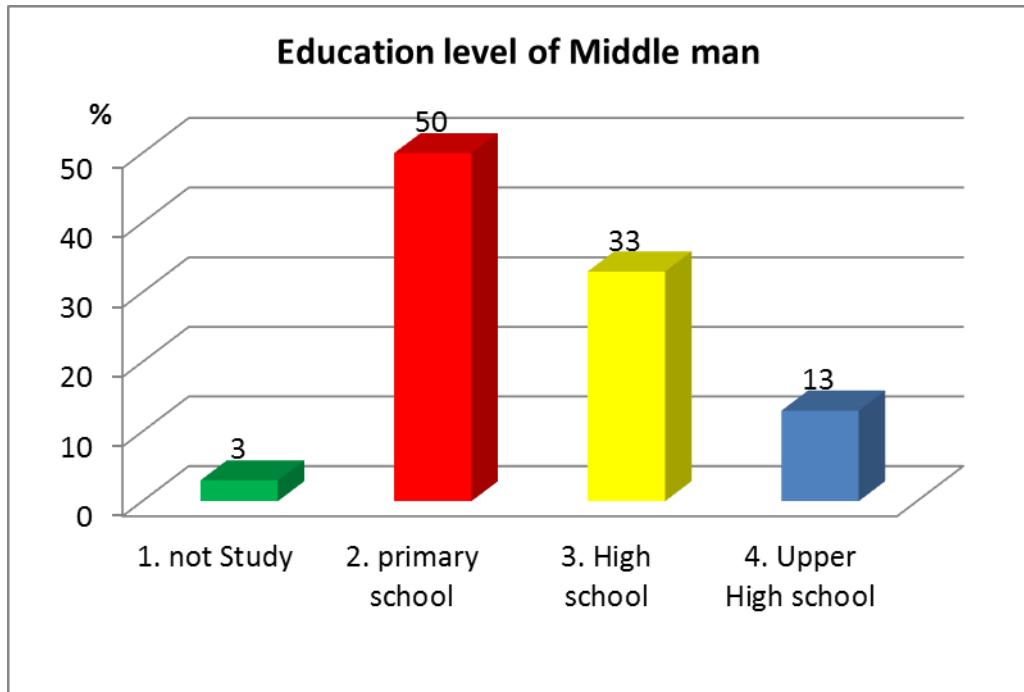
This figure shown that the most education level of Middle man is primary school cover 50%.

Table3. Identification the price for buys and sells Rice

Identification the price for buy and sell Rice	Percentage
1. The Price control by government	-
2. Agree between Buyer and Seller	50
3. Market price	43
4. The price depend on Middle man	7
Total	100

In this table shown that they don't use the price control by government, they agree the price of rice between buyer and seller cover 50%.

Table4. Value added of Middle man.

Middle man	Value (Kip/Ton)
I. Cost production	**2,195,360**
1. Cost production to buy paddy rice	1,921,676
2. Cost for Labors	43,432
3. Rice bags	10,046
4. Transportation cost	219,505
5. Depreciation of Vehicles	702
II. Income from selling paddy rice	**2,410,977**
III. Net Income (2-1)	**215,617**
Value added	Percentage
Value added=((III/II)x100)	9

In this table shown that the middle man bought the paddy rice from the farmers and sold other enterprenuars, Average value added is 9%(deducted all capital and cost production from total income).

Figure14. selling paddy by middle man
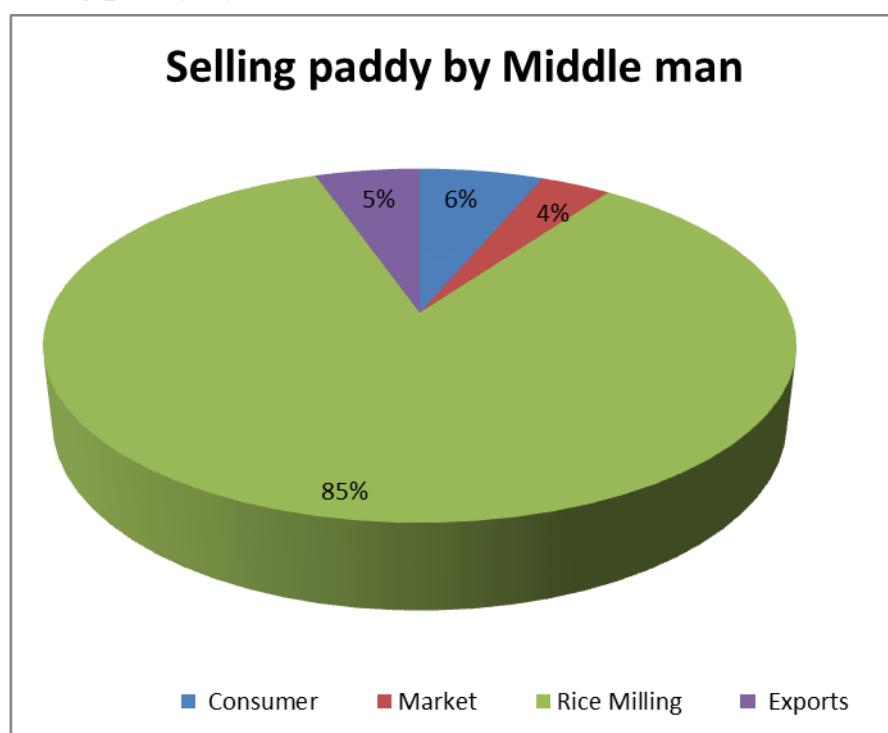
The most paddy rice sold to millers is cover 84.64%, to consumer (people) is 6.35% and sold to Market is 3.61% and to export is 5.37% (almost export to China and Vietnam).

Figure15. the Issues of middle man
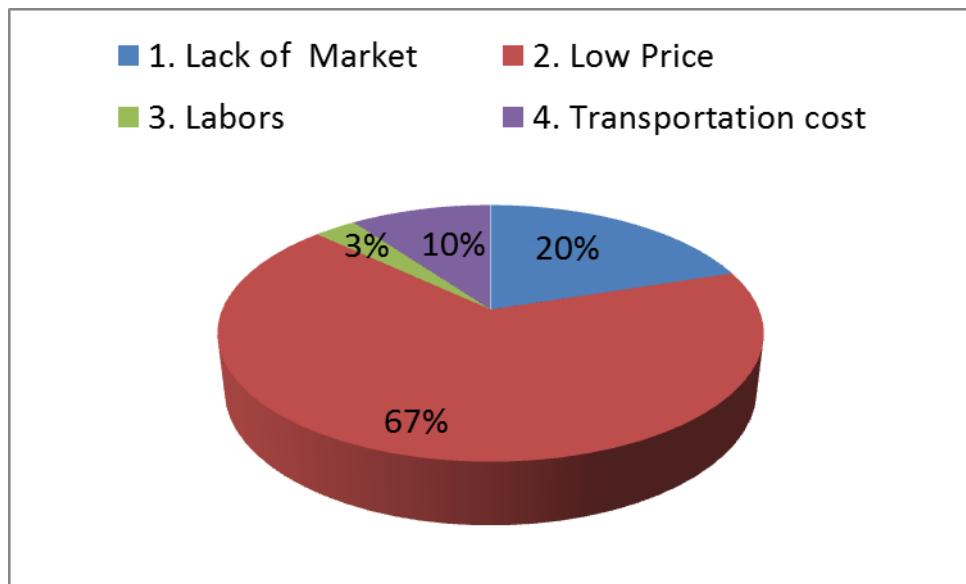
This figure shown that the biggest issues of Middle man operating this activities is low price cover 67%,

12.3. Analysis Entrepreneurs questionnaires:

- Rice Miller

- Noodle Powder

- Noodle

- Rice cake (Khaokhob)

- Brewery (Rice)

12.3.1. Rice Miller

Table5. Value added of Rice Millers.

| Item	Value (Kip/Ton)							
	Big Rice Miller		Medium Rice Miller		Small Rice Miller			Average
I. All cost production		2,611,548		2,081,699		1,811,819		2,168,355
1. Cost buy paddy rice		2,027,474		1,792,470		1,577,522		1,799,155
2. Labors		55,123		49,312		31,021		45,152
3. Rice Bag		30,030		7,130		8,013		15,058
4. Electricity		70,100		30,132		41,101		47,111
5. Transportation cost		383,132		201,131		151,823		245,362
6. Tax		2,163		596		264		1,008
7. Depreciation of Building		11,650		267		397		4,105
8. Depreciation of Machinery		18,620		429		965		6,671
9. Depreciation of Vehicles		13,256		232		713		4,734
II. Income from selling rice		4,408,702		3,357,227		5,046,000		2,168,355
1. Milling rice (60%)	6,674,504	4,004,702	5,020,000	3,028,227	5,580,516	3,012,000	8,265,061	5,083,573
2. Bran (30%)	980,000	294,000	780,000	234,000	846,667	234,000	794,667	594,762
3. Broken rice (5%)	2,200,000	110,000	1,900,000	95,000	1,966,667	90,000	2,628,333	1,528,571
4. Husk (5%)								
III. Net income(II-I)		2,381,229		1,564,757		3,468,478		2,471,488
Value added		**Percentage**		**Percentage**		**Percentage**		**Percentage**
Value added =((III/II)x100)		41		38		46		42

For Millers, Average Value added (big, midieum and small millers) is 42%
(deducted all capital and cost production from total income **such cost buy paddy rice, labors, rice bags, electricity, transportation, tax…etc.**).

Figure16. Rice selling by Rice millers
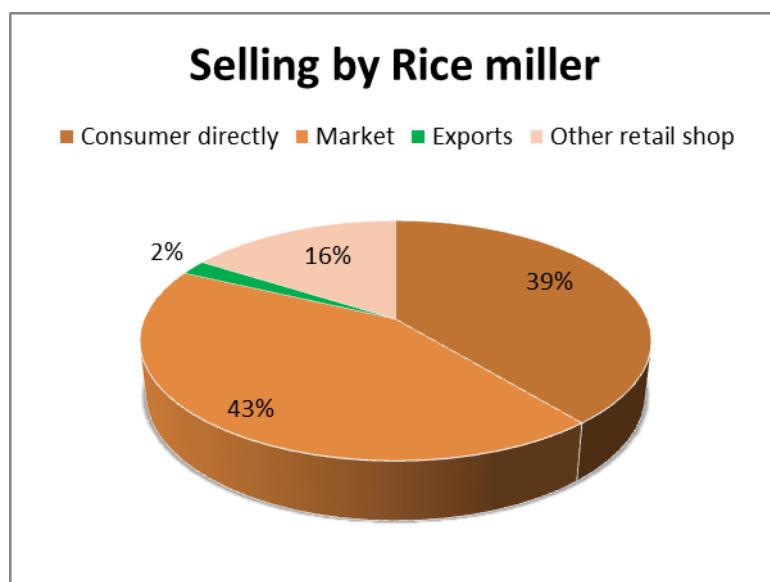
they sold the milling rice to market is cover 43%, to consumer (people) is 39%, to export is 16%(almost export to China, Thailand and Vietnam, For the IDP miller, they export rice to China, Thailand, Gernany and France) and sold to retial shop is cover 2%.

Figure17. The main issues of Rice millers operating this activities.
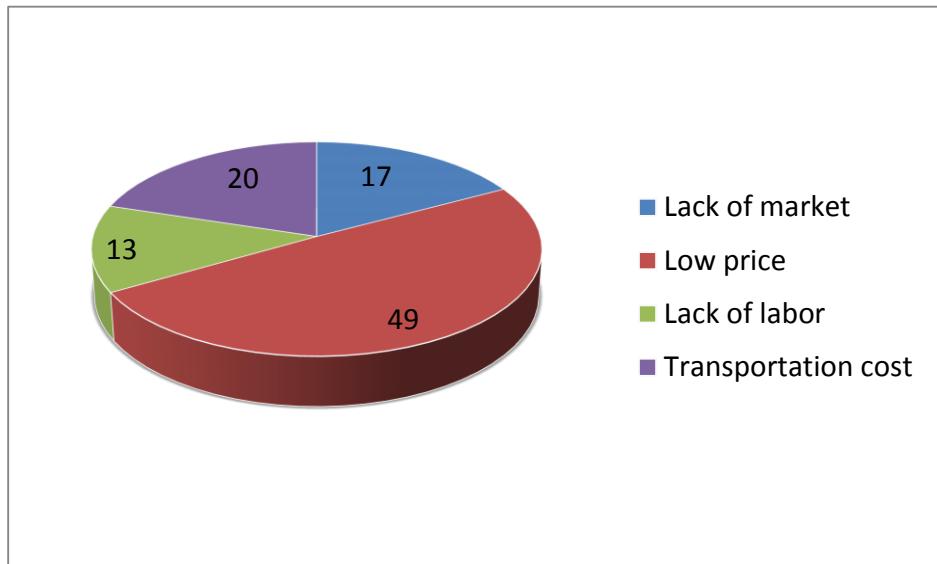
This figure shown that the biggest issues of Rice millers operating this activities is low price cover 67%.

12.3.2. Noodle Powder

Figure18. Value added of Nooddle powder.

Noodle powder	Value(kip/head)
I. Cost production	**85,651**
1. Cost for buy milling rice 14kg	60,342
2. Labors	10,864
3. Salt	1,829
4. Water fee	1,478
5. Electricity fee	5,824
6. Charcoal/firewood	2,688
7. Packing cost	229
8. Depreciation of Machinery	1,148
9. Tax and other	1,248
II. Income from selling	**95,003**
III. Net income (II-I)	**9,352**
Value added	Percentage
Value added =((III/II)x100)	**10**

Note: Milling rice 14 kg can produce 1 Noodle powder head (20kg)

For Noodle powder maker made by white rice, Average value added is 10%(deducted all capital and cost production from total income).

12.3.3. Noodle

Figure19. Value added of Nooddle.

Noodle	Value (Kip/kg)
I. Cost production	**6,407**
1. Cost for buying Noodle powder	4,750
2. Labors	495
3. Salt	78
4. Water fee	191
5. Electricity fee	508
6. Charcoal/firewood	177
8. Maintenance cost of Machinery	139
9. Tax and other	70
II. Cost for selling noodle	**8,970**
III. Net income (II-I)	**2,563**
Value added	**Percentage**
Value added=((III/II)x100)	**29**

Noodle Marker, they bought the Noodle powder and then they produce noodle. Average value added is 29% (deducted all capital and cost production from total income). they sold the Noodles to consumer (people)is cover 73.73%, and sold to Market is cover 26.29%.

12.3.4. Rice Cake (Khaokhob)

Figure20. Value added of Rice Cake (Khaokhob).

Khaokhob	Value(Kip/Piece)
I. Cost production	**1,485**
1. Cost for buying Milling Rice	391
2. Labors	241
3. Salt	5
4. Oil	361
5. Sugar	168
6. Bag	82
7. Straw rope	5
8. Transportation cost	109
9. Charcoal/firewood	123
II. Income from selling khaokhob	***2,000***
III. Net income (II-I)	***515***
Value added	**Percentage**
Value added =((III/II)x100)	**26**

For Rice cake Maker, Average value added is 26% (deducted all capital and cost production from total income), they sold Rice cake to Market is cover 95%, and sold to consumer (people) is cover 5%.

12.3.5. Brewery (Rice)

Figure21. Value added of Brewery (Rice)

White Alcohol	Value(Kip/litter)
I. Cost production	**5,393**
1. Cost for buying milling rice	4,249
2. Labors	461
3. Powder	209
4. Water fee	29
5. Charcoal/firewood	309
6. Transportation Cost	60
7. Packing cost	77
II. Income from selling white alcohol	**7,281**
III. Net income (II-I)	**1,888**
Value added	Percentage
Value added=((III/II)x100)	26

Remark: Rice 1 Kg can produce **White Alcohol 1 litter**
(boil 3 times and Mix together)

For Brewery Rice Maker, they bought the broken rice to produce Brewery Rice or white alcohol, Average value added is 26% (deducted all capital and cost production from total income), The most Brewery Rice sold to to retial shop is cover 39.49%, to consumer (people) is 27.54%, export is 20.19%(almost export to Vietnam) and sold to Market is 12.77%.

XII. Conclusion.

Figure22. FVC From Producer to Distribution
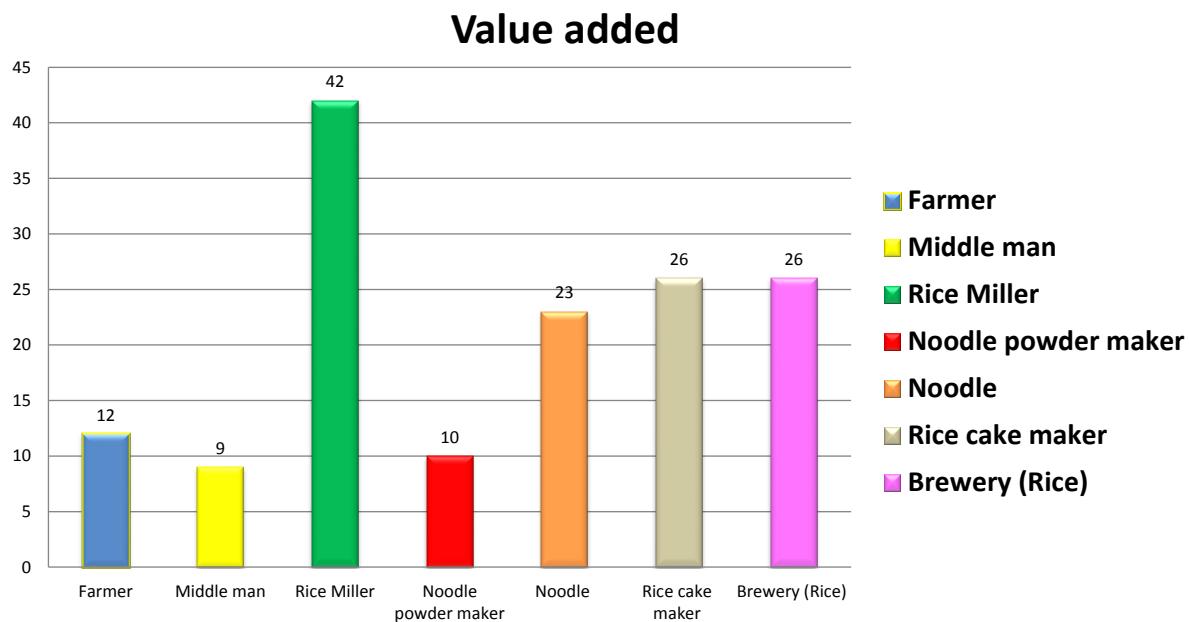
Value added

This figure shown that food value chain on Rice in savannakhet province from producer to comsummer, the highest value added is Rice miller(42%).