

Draft Report:

**Food Security through the Livestock (Cattle and Buffalo) Production:
Case study at Phonxay District, LuangPhabang Province, Lao PDR.**

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Abstract

The objectives of this research were to study: 1) socio-economics of the farmers, 2) livestock production system 3) problems of livestock production in Phontong Custer and 4) livestock consumption and supply. The total populations that were 192 households, while 130 households of them were selected as the samples for the research. The data were collection by the interview method and analyzed by SPSS for Windows and Excel program. The statistics used frequencies, percentages, means, maximum, minimum.

Results of research found: 80 percent of the household heads are male with an average age of 42.4 years old, 64.4 percent of the household heads had education level primary school and lower, and the average number of members in each household is 5 persons. 97.7 percent of the household heads had the main occupation of being farmer. The average of the total cash income from agricultural activities was 3,405,041 kip. The average of the total cash income from livestock production was 4,635,400 kip. The average of total non-farm income was 2,307,476 kip. The average of total expenses for agricultural was 403,556 kip. The average of total expenses for non-farm activities in 2008 was 2,202,364 kip.

Livestock production in Phontong zone showed there were two main raising systems used in livestock production were free range and semi-free range. 70.8 % of total households used semi-free range system. 100 percent of total households used local breed, the live weigh is about 300-350 kg and tall 120-135 Cm for the malle and 200-250 kg and tall 90-105 Cm for the female. In 2008, there were 594 heads of buffalo and 266 heads of cattle in Phontong Custer, The average of buffalo number per household was 2.8 heads and 2.4 heads of cattle. There were 12 percent of increase rate by cattle and only 5 percent of buffalo. There are four village have forage plantation. There are many diseases face to animals in Photong custer included Haemorrhagic Septicemia Foot and Mouth Disease. In the year 2008 in Phonthong zone sold buffalo about 67 heads and cattle or cows about 42 heads. The average price of animal were 3.000.000 - 4.800.000 kip per head of buffalo and 1.000.000 - 2.000.000 kip per head of cattle by local trader, 3.000.000 -5.000.000 kip per head of buffalo and 1.000.000 -2.200.000 kip per heads of cattle by District level and 3.000.000 - 5.500.000 kip per head and 1.000.000 -2.500.000 kip per heads of cattle by province level.

LIST OF TABLES

	Page
Table 2.1 Cattle and Buffalo Numbers in Laos	4
Table 3.1 Number of farmers and samples	9
Table 4.1 Buffalo and cattle numbers in Phontong Custer	13
Table 4.2 Livestock production activities	14
Table 4.3 Increase rate the livestock production	14
Table 4.4 Trade of livestock in Phontong Custer	18
Table 4.5 Price of livestock	21

LIST OF FIGURE

Figure1. Market chain for livestock in Phongtong Custer	Page 19
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TABLES OF CONTENTS

List of table

List of figure

CHAPTER I INTRODUCTION

1.1 Background	1
1.2 Research Objective	2
1.3 Scopes of Study	2
1.4 Expected Outcomes	3

CHAPTER II LITERATURE REVIEW

2.1 Livestock Production in Laos	4
2.2 Potential of livestock production	6
2.3 Trade of livestock	7

CHAPTER III RESEARCH METHODOLOGY

3.1 Research Location	10
3.2 Population and Sample size	10
3.3 Data collection method	11
3.4 Data Analysis	11

CHAPTER IV RESULT OF STUDY

4.1 Socio-economic characteristics of the farmers	12
4.2 Livestock production system at Phonthong Custer	12
4.2.1 Raising systems of livestock production	12
4.2.2 Breed	13
4.2.3 Cattle and buffalo numbers in Phontong Custer	13
4.2.4 Livestock numbers increasing	14
4.2.5 Service and promotion for livestock production	15
4.2.6 Feed resource	15
4.3 Problems of livestock production by farmers	16

4.3.1 Main problems of livestock production	16
4.3.2 Techniques problem	16
4.3.3 Diseases vaccination and treatment	16
4.4 Market situation for livestock	17
4.4.1 Market chain for livestock in Phontong Custer	17
4.4.2 Livestock Trade	18
4.4.3 Price of livestock	20
4.4.4 Market demand and supply	21
CHAPTER V CONCLUSION AND RECOMMENDATION	
Conclusion	22
Recommendation	22
REFERENCE	

CHAPTER I

INTRODUCTION

1.1 Background

Livestock production is an important component of smallholder farming systems in Lao PDR, as livestock plays important roles as the saving and source of income. The sale of livestock accounts for more than 50% of the family cash income for smallholders in the Upland areas. Over 95% of all livestock is produced by smallholders and there is only a small number of commercial pig and poultry enterprises near major urban markets. In addition to income, livestock also provides other benefits such as meat, milk, draught power, manure etc. The livestock population in 2003 was approximately 1.24 million cattle, 1.11 million buffalo, 1.65 million pigs, 16 million poultry and about 136,500 goats (DLF, 2003). The average annual livestock population growth rate for the last decade are 4% for cattle, 2% for buffalo, 6% for goats, 3% for pigs and 6% for poultry.

These indigenous animals contribute more than 90% of national meat consumption. Base on the strong demand for meat both in domestic market and neighboring countries, there are considerable opportunities to increase the production of cattle, buffalo and goats (Gray, 2004; Vernon, 2006). This is because Laos has a competitive advantage in large ruminant production over neighboring countries, as ruminant production in Laos requires low capital and input but return on capital is quick.

Luangphabang Province is the second largest province with an area of 16,875 square kilometers, situated in the northern central region of the Laos. The topography of the province is high mountainous, which covers 90 % of total area of the province. The average altitude is around 303 m above sea level. A mean of temperature is 25^C.

Most of people, especially in rural areas engage with agriculture both in crop (cash crops and other upland crops) and livestock production. The livestock production is mainly smallholder production systems, where the raising systems are traditional and subsistence. The livestock supplies more than 90 % of total meat consumption in the province. Since, Luangphabang is one of famous site for tourists, where the number of tourists increases annually from 600,000 persons in 2006 to about 2,000,000 persons in 2008. This also mean that the demand for meat increases

sharply in the recent years and there has been a short supply of meat during the high tourist season. To overcome this problem, provincial authority has been allowing the import of meat and meat product from other provinces and neighbouring country. In the meantime, the province has developed a strategy to use this opportunities to improve cattle and buffalo production in order to ensure the food security by focusing cattle and buffalo production in the potential areas. Phonxay district is one of the areas with largest land that suitable for livestock production. The district aims to be the main supply source of livestock to Luangphabang market and export to other province.

1.2 Research Objective

The objectives of the research are to:

1. Document of the livestock production system at Phontong Custer, Phonxay District, LuangPhabang Province.
2. Study on problems of livestock production by farmers.
3. Study on Market situation for livestock.

1.3 Scopes of Study

Phonexay district is one of 11 districts in Luangphabang and consists around 10 clusters in the district. Phonthong Custer (Kumban) is one of them and there are 7 villages in the Phonthong Custer. These villages are Phonthong, Na Njoy, Killai, Na Njew, Bockham, Vungkon and Viengchalean. This study aims to investigate farmers, who are practice livestock production in these villages, Phonxay District, Luang Prabang Province.

The population of this study will be households who practice livestock. The total number of farmers was 192 households. This will be the population of this study. A total of 130 of them will be selected from the population. This sample was calculated and selected as shown in research methodology.

1.4 Expected Outcomes

- 1) This study will provide an understanding of existing situation of the livestock production in Phonxay District, Luangphabang Province.
- 2) This study will identify the problems in smallholder livestock production, in other to formulate the recommendations and suggestions for improving.
- 3) To develop projects in the areas in the near future for future extension.
- 4) The information getting from this study will be used for planning of livestock development in the areas.

CHAPTER II

LITERATURE REVIEW

2. 1 Livestock production in Laos

Agricultural growth is widely recognised as a major contributor to reducing poverty in developing countries. It is not surprising then that large amount of aid funding is devoted to improving the productivity of agriculture in developing countries. Agriculture is a major component of Laos' economy accounting for over 32 percent of the gross domestic product (GDP) in 2008. Within this, livestock is estimated to contribute around 10 per cent to GDP. However, this figure masks major regional differences. In many upland areas, livestock accounts for over half of all cash income.

The major livestock production system in Lao PDR is the smallholders' production system, which is characterized by low inputs and low outputs. This system covers the production of all indigenous animals, representing more than 90 % of total meat consumption in the country (Bouahom, 2000).

The main traditional livestock management practices in the smallholder systems are based on free range grazing systems, which rely more on natural feed resources that available in the areas. In free range systems, farmers leave animals graze freely in the fallow land, forest and new harvested areas. Animals are collected again about one to two months before planting season. Currently, the number of animals per family is different among the regions such as 9.9 heads per household in flat mountain area, 7.2 heads per household in upland area and 4.4 heads per household in low land (Phongsamuth, 2005).

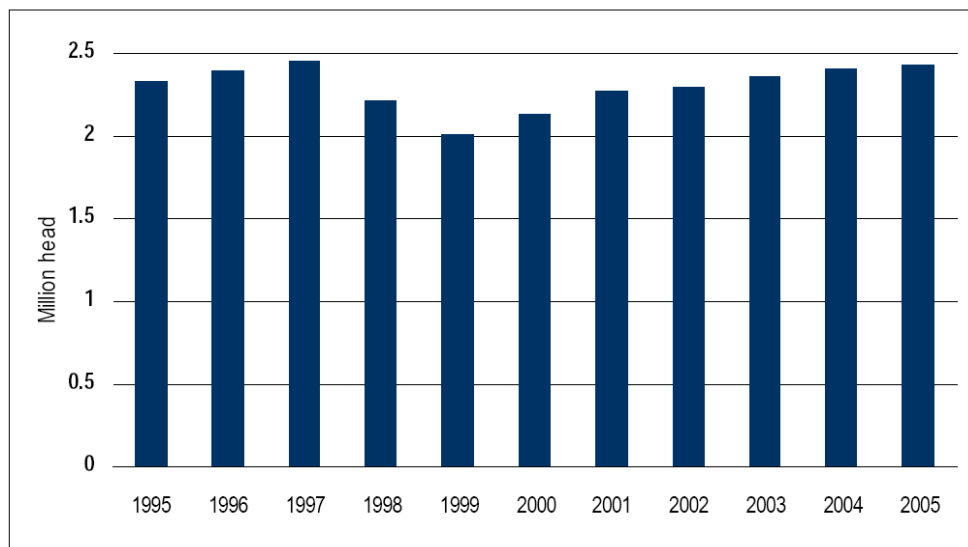
Under the traditional systems, the growth rates are low, with animals taking 4-6 years to reach mature weights. Average live weights are up to 350kg for male cattle and 450kg for male buffalo. Calving rates are relatively low, with females producing their first calf at an age of 3 years, and an average annual calving rate of around 70 per cent. Calving rates for buffalo are considerably lower, estimated at around 50 per cent. This performance reflects not only disease prevalence, but also parasite control and poor nutrition.

Another problem is inbreeding, which is very common in the traditional system. This occurs partly because of uncontrolled breeding and there is very little effort has been made in

genetic improvement. Indeed, effort to better use and develop indigenous animal genetic resources in Lao PDR are far behind the investments that have been made to develop plant genetic resources, in particular rice genetic resources. There is thus a potential to significantly increase the contribution of goats to food security and rural development through investments in genetic and management improvement and control of animal diseases (NABP, 2004).

Although cattle and buffalo are raised in traditional ways, but they have important roles in farmer livelihood, as they are a major source of protein, use or scarify for traditional ceremony or fests, accumulating and cash income for smallholders in Laos, particularly in upland areas. Buffalo are closely tied to draught power and land cultivation, while cattle are used more for saving and farmers will sell cattle out when they need cash for family. FAO estimates that there are around 2.4 million cattle and buffalo in Laos. Chart 2.3 illustrates cattle numbers in Laos since 1995. According to the FAO, cattle and buffalo numbers have remained relatively steady, and within this, buffalo numbers have fallen slightly and cattle numbers have increased.

Table 2.1: Cattle and Buffalo Numbers in Laos



Data source: FAO 2006.

The major difference between cattle and buffalo and other livestock industries in Laos is that there is significant trade in live animals to neighboring countries. Much of this trade is informal and hence not captured in published statistics. FAO statistics put live exports of cattle and buffalo at around 30 000 head; however this figure fluctuates wildly. Official import

statistics from Thailand tend to match the FAO data, and Thailand is the major destination for cattle exports from Laos. However, more realistic estimates of cattle and buffalo exports to Thailand are around 100 000 per annum. In addition to this, there is an emerging export trade with China and Vietnam as transport linkages improve. However little is known about the numbers involved in this trade (ADB 2005).

2.2 Potential of livestock production

As mentioned earlier that approximately 95% of livestock is produced by smallholders. Livestock are kept by smallholders for several reasons that have been described earlier, but the two main reasons are firstly a livelihood security when crop production fails, farmers often sell out the animals and buy rice. Secondly, livestock can be the main source of income in particular in the North of Laos, where people have fewer choices than in the lowland areas. It is obvious about the importance of livestock production, but how to move it to more improved production systems that give high animal productivities is need to be more focused for the next development activities.

There is a potential to improve and develop livestock production, because firstly smallholders already have local knowledges and experiences on livestock management and production which have been transferred from generation to generation, there is natural grassland and other areas that suitable for ruminant production and the most important is that the government of Laos has develop strategy for diversifying its agricultural economy, particularly on livestock sector.

Although all mentioned advantages it needs to acknowledge that under traditional raising systems the livestock production will not be alternative for smallholders to move to more market oriented production systems. In order to do that, it needs to change from traditional systems to more manageable systems, which will help to improve the productivities of animals and this can lead to maximize the income for smallholders. The first step for changing to manageable systems is to find solutions for existing problems such as feed shortage in both quality and quantity and seasonal outbreak of diseases. Up to now, there are several government programs, NGOs and development projects have been working on improving of feed and feeding systems, which will lead to other improvements such better management and animal health.

These research and development projects are as the followings:

- Forage for Smallholder Project (DLF/NAFRI/CIAT): 1995 – 1999. This project worked on identifying broad adaptive forage varieties to environment conditions in Laos.
- Forage for Smallholder Project (NAFRI/CIAT): 1999-2002 – This project was a regional project that worked in 7 SE Asian countries including Laos. The project worked on finding ways to integrate the adapted varieties into farming systems.
- Forage and livestock System Project (NAFRI/CIAT): 2000-2005. This project worked in 2 provinces of Luangphabang and Xiengkhuang to develop forage and feed technologies with farmers to improve animal productivities. The project worked with more than 1500 farmers at the end of 2005.
- Livestock and Livelihoods Development Project (CIAT /NAFRI): 2003 – 2005 – This was another regional project worked in 6 SE Asian countries including Laos. The activity in Laos was focused on the improvement of goat production in Savannakhet province.
- Capacity Building for Smallholder Livestock Development Project (DLF/NAFRI/CIAT): 2006-2007. This project was aimed to expand the achievements of Forage and livestock systems project to established models of forage development with farmers and to build the capacity of extension staff for livestock development, in preparation for ADB Loan project (Northern Regions Sustainable Livelihood and Livestock Development Project)
- Forage Legumes for Feeding Village Pigs Project (NAFRI/CIAT): 2005-2008 – This has been one of the successful project in working with farmers to improve pig feeding. By working in cooperation with NGOs, project works with more than 1200 farmers in the North of Laos.
- PRONAE (NAFRI/CIRAD): 2003 - Identified a system for sustainable land use based on establishment of large forage areas (1 ha) with zero-tillage.

2.3 Livestock trade

The trade of agricultural commodities in small quantities as cross-border trade works against the management of their quality and efficient and timely trade. Laos needs to be able to trade its products in volume with consistent quality assured and deliveries made on time. Unless it does this, Lao products will not be able to take a position in the market and continue to fulfil the role of simply meeting shortfalls when supply from other sources falls short of demand.

The Small-scale Agriculture Enterprise Development in the Upland (SADU – a NAFRI-CIAT project) has developed a process to assess livestock market and provide a platform for all people involving in the marketing system (market chain) to discuss and share the problems and opportunities for improvement. The activities have been implemented in Xieng Khouang and the result of the implementation provides an example of how trade can be enhanced for other products. This process systematically:

- (a) Increases production volume
- (b) Facilitates the emergence of service providers, to enable expansion of improved production
- (c) Reviews and reforms trade procedures

This can be regarded as a pathway for governments and projects to provide an enabling environment for efficient trade. If this is achieved for livestock in Xieng Khouang this pathway could also be applied to other products in other provinces of Lao PDR (SADU-CIAT, 2007).

Livestock has also been a key product of Lao upland farmers. Results of more than a decade of research with planted forages now show that supplementing animals' diets with forages can double weight gain and improve fertility rates. While high productivity is now within reach for upland farmers, market access remains a significant issue. To secure markets for livestock, Lao farmers and livestock traders need to shift from 'border trade' to forming 'trading partners'.

The challenge here will be equipping Lao actors with the capacity to deliver livestock according to contract; providing assigned volumes, on time and according to the specifications of buyers. Streamlining cumbersome trade procedures will play a key role in enabling market oriented production of livestock to emerge (Linkham, 2007).

The reason for focusing on the production of goods in the mountainous areas is the limited available cultivation areas. Because of this, the increase in productivity and rice production in the large and small plains are important as it can yield surplus for exchanging goods with poor districts, the majority of which is located in mountainous areas. Alongside the rice security, the increase in production of meat, egg and fish have to be ensured by 5% yearly or 145,000 tons of meat and 100,000 tons of fish, an average 40-50 kilogram/head/year, which represent a fairly good standard consumption for developing countries. In order to reach those levels, the production has to be expanded, ensure at least 80% of animals' vaccination coverage

in urban and suburban areas and 40% in rural areas. In urban and suburban areas, the raising of animals in the farming system has to be expanded to represent 20% of all domestic animals. The important issue is to improve the food processing industry for animals, and the prevention of illegal import of meat and eggs as it will destroy the local production according to lesson learned in the past (MAF 2008).

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research location

Luangprabang is one of the six provinces in the North of Laos and shares the borders with: Oudomxay, Houaphanh, Xiangkhouang, Bokeo, Xayyabouly, and Vientiane province. Luangprabang province consists of 11 districts such as: 1. Luangprabang, 2. Chormphet, 3. Xiangngern, 4. Pak-Ou, 5. Nan, 6. Pak Xeang, 7. Nambark, 8. Ngoi, 9. Phoukhoun, 10. Phonxay districtss. The province has 3 ethnics groups (Laolum, Kamu, and Laosung) and 102 village groups, 852 villages in which 47 of them are the poorest in the country.

The research area is a mountainous area located in Phonxay District, LuangPhabang Province, about 122 km from Luangphabang Town. Research area is Phonthong Custer covered 7 villages: Phonthong, Nangoy, Killai, Vungkhon, Nangie, Bokham and Viengchalein village. All of them can access only in dry season, there is no electricity, communication and even market. There are two ethnic groups of Lao Theung (Khamu) accounted for 85 percent and Lao Lum 15 percent of total population.

3.2 Population and Simple size

The village of the study consist of 7 villages, the population of this study were farmers who produce livestock. The total number of farmers were 130 persons that were selected as the population of this study.

- Sample size

To obtain a suitable number of sample; Taro Yamane formula was used to calculate sample size as follow (Yamane, 1967).

$$n = \frac{N}{1 + Nd^2}$$

n = Number of sample

N = Number of farmers

d = error data from sample data collection

Based on the above formula, it can be calculated the sample number of the study as follows.

N = 192 farmers

d = .05 (5%) (Error data is allowed not more than 5%)

$$n = \frac{192}{1 + 192 \times (.05)^2}$$

n = 129.7 = 130 farmers

Therefore, the sample size of the study is 130 farmers

- Sampling method for this study to be used is stratified random sampling.

After calculating number of sample required, simple random sampling was applied to select samples in each group.

Table 3.1 Number of farmers and samples

Target group	Total farmers	Number of sample
Killai Village	27	18
Nangoy Village	21	14
Phontong Village	63	43
Nangill Village	25	17
Bokham village	27	18
Vungkhone village	7	5
Viengchalein village	22	15
Total	192	130

3.3 Data collection method

The data collection in the field was carried out during the during March to April 2009. 6 assistants were employed to collect the data. The data collection method applied was individual interviews with sample respondents. The tool used to collect data for this study was a structured interview schedule. Field data collection included reviewing related secondary data such as reports, statistical data, maps, and documents. Primary data are interviewing stakeholders such as PAFO, DAFO, Village leaders and farmers.

3.4 Data Analysis

The steps involved in the data analysis were all interview schedules must be checked to make sure that there will not be any missing information. The row data was input into a computer and analyzed by using SPSS for windows. The results were reviewed and discussed to make final conclusions and recommendations.

CHAPTER IV

RESULT OF STUDY

This chapter presents the results of the study were found from interviewing. The interview was focused on: 1) socio-economics of the farmers 2) livestock production system at Phontong Custer 3) problems of livestock production by farmers and 4) livestock consumption and supply demand.

4.1 Socio-economic characteristics of the farmers

There are 80 percent of the household heads are male with an average age of 42.4 years old, 64.4 percent of the household heads had education level primary school and lower, and the average number of members in each household is 5 persons. 97.7 percent of the household heads had the main occupation of being farmer. The average of the total cash income from agricultural activities was 3,405,041 kip. The average of the total cash income from livestock production was 4,635,400 kip. The average of total non-farm income was 2,307,476 kip. The average of total expenses for agricultural was 403,556 kip. The average of total expenses for non-farm activities in 2008 was 2,202,364 kip.

4.2 Livestock production system at Phonthong Custer

4.2.1 Raising systems of livestock production

From result of the study showed that there were two main raising systems were used by smallholder. These systems were free range and semi-free range. Free range for whole year was found in Phongtong, Nangoy, Killai and Nangill village of Phontong Custer covered 92 households or 70.8 % of total households. Semi-free range was found in the other three villages of Bokham Vungkhon and Viengchalein of Phontong Custer covered 29.2 % or 38 households, Vungkhon village has land limitation for animal raising, because this village was relocated from high mountain. Viengchalein village is located farther than other villages, so their animal raising was in natural forestry with extensive agricultural systems.

4.2.2 Breed

Usually, farmers in Phontong Custer raised local breed of cattle and buffalo that have a low growth rate. The local breed is quite fertile and well adapted to the mountainous area. The color is usually black or white for buffalos; brown, black and white for cattle. They can reach a mature weight of about 400-600 kg; in general the live weigh is about 300-350 kg and tall 120-135 Cm for the malle and 200-250 kg and tall 90-105 Cm for the female. Almost all of farmers in Nang, Killai, Nangill, Bokham Vungkhon and Viengchalein village got cattle from their relatives in Phontong Custer. And only farmers of Phontong village got 28 local breeds of cattle supported by Upland Research and Development Programme (URDP).

4.2.3 Cattle and buffalo numbers in Phontong Custer

In 2008, there were 594 heads of buffalo in Phontong Custer and the details showed in table 4.1. The highest number of buffalo was in Phontong village with 158 heads of buffalo or 26.6 percent of total number of buffaloes and the lowest was in Vungkhone was 12 heads of buffalo accounted for 2 percent only.

From seven villages, there were 266 cattle with the highest number of 86 cattle at Killai and the lowest number was in Bokham with 4 cattle only. There was no cattle in Nangoy village, because in 2002 the animals in the village died from disease.

The number of cattle per farmers ranges from 1 to 10. The average of cattle number per household was 2.3 heads of cattle. While for buffalo ranges from 1-8 heads with an average of 2.8 heads.

Table 4.1: Buffalo and cattle numbers in phontong Custer

No.	Villages	Buffalos (head)/Years			Cattles (head)/Years		
		2006	2007	2008	2006	2007	2008
1	Phontong	152	147	158	49	67	84
2	Nangoy	75	82	90	-	-	-
3	Killai	46	51	55	49	67	86
4	Nangill	53	77	90	31	48	55
5	Bokham	84	97	115	0	4	4
6	Vungkhone	2	9	12	16	21	26
7	Viengchalein	57	68	74	0	8	11
Total		469	531	594	145	215	266

Source : DAFO 2008.

4.2.4 Livestock numbers increasing

From result of study shown 67 households or 48.4 percent did not buy new buffalo, 47 households accounted for 36.2 percent bought for one head of buffalo and 20 households or 15.4 percent of households bought two heads of buffaloes.

Estimate the buffalo numbers increasing in Phontong:

In 2007, there were 594 heads of total buffalo, from which 33 heads died, 90 heads were sold, bought 83 heads and new born were 116 heads in 2008. There were 226 heads of total cattle in Phontong Custer in 2007, from this 17 heads died, 42 heads were sold, 52 heads were bought and there were 63 heads of new born.

Table 4.2: Livestock production activities

Livestock production activities					
	Total buffalo	death	sell	Buy	born
Buffalo	594	32	67	83	116
cattle	226	17	42	52	80

Table 4.3 : Increase rate the livestock production

To estimate increasing the livestock number		
	Buffalo	Cattle
Animal number final (ANF)	694	299
Average of animal number (AAN)	644	262
Increase Rate (IR)	15.50%	28%
Net Increase Rate (NIR)	5%	12%
Production Rate (PR)	14%	34%
Return Benfite (RB)	19%	46%

- Animal number final (ANF) = Total - death-sell+buy+new born
- Average of animal number (AAN) = (total+ ANF)/2
- Increase Rate (IR) = (ANF-total)/ AAN*%
- Net Increase Rate (NIR) = (ANF-total-buy)/ AAN*%
- Production Rate (PR) = sell/AAN

- Return Benfite (RB) = NIR+PR

The result showed that the number of cattle and buffaloes increase by 46 and 19 percent, respectively. The different in increasing number of these animals was because the mortality of cattle was lower than buffalo (Table 4.3). From 2007 to 2009, the number of cattle increased about 12 percent compared to only 5 percent of buffaloes.

4.2.5 Service and promotion for livestock production

In 2002, Cesvi Project was implemented the livestock production activities included animal health training. The project worked in 10 villagers from Phontong, Nagnoiy, Killai, Bokham and Viengchlein villages to train and support some vaccines to farmers.

In 2005, The Upland Research and Development Programme funding by SIDA also started to work in the areas with focus on research on agriculture, forestry and livestock. The project activities in the areas are : to :

- Support 28 heads of cattle to farmers in Phontong villagers
- Establish livestock production group.
- Demonstrate the forage plantation within farmer's farm.
- Training on techniques of livestock production, livestock management and diseases vaccination and treatment.

4.2.6 Feed resource

The main feed resources in Phontong zone are fodder trees and shrubs and natural grasses. In general, the livestock are grazed freely around the villages, in fallows area or forestland, throughout the year. Some farmers working together as a group and share the responsibility to check their animals in the grazing areas. In the planting season or rainy season the livestock were confined or tethered in special area to avoid damage to the crops. Almost all farmers facing the problem of feed shortage during the period of dry season, in particularly from April to May.

Currently, there are farmers in 4 villages of the study area planted forage for animal in their lands. These villages are Phontong (27 households covered 11.57 ha), Nagnoiy village (1 household accounted for 0.6 ha), Nagnill village (5 households covered 0.33 ha) and Killai village (1 household or 0.5 ha). There were four varieties of forage varieties have been planted. These included Guinea grass, Ruzi grass, Mulato grass and Stylo.

4.3 Problems of livestock production by farmers

The problems in livestock production found in this study were:

4.3.1 Main problems of livestock production

- Lack livestock production management
- There is no animal health service provider
- Lack of vaccine availability
- Smallholder farmers and extension workers have limitation of knowledge and understanding of the animal health
- Transportation is a significant constraint, particularly to remote areas. Vaccine is transported to district by either motorbike or bus. It can take up to 4-5 hours to transport vaccine from province to Phontong custer.

4.3.2 Technical problems

- Almost all livestock (cattle and buffalo) are local breed with low growth rate. Breeding variety has limited.
- Feed shortage occurs for 2 - 3 months, especially from April to May. The feed is usually low in protein content.
- Livestock raising system by famers were free range, therefore their animal always have disease problem.
- The grazing land is limited and also farther from their village.

4.3.3 Diseases vaccination and treatment

Normally animals get infected with diseases in beginning of rainy season that affects livestock numbers to be decreased. There are many diseases that outbreak in Photong custer. These included:

- Haemorrhagic Septicemia
- Foot and Mouth Disease.

From the result of study show that 50 households vaccinated their animals on two times per year while accounted for 38.5 percent of total households, 35 households or 26.9 percent was vaccinate two time per year and there were 45 households or 34.6 percent have not to vaccinate their livestock.

A head of Phontong custer said that farmers in Phontong, Nagnill, Nagnoy and Killai village vaccinate their livestock, because those village used semi-free range and also have forage plantation. However farmers of Viengchalein, Bokham and Vungkhone village do not vaccinate, because animals are kept in free range.

ADB (2005) reported that a farmer would decide whether or not to vaccinate his livestock for a particular disease based on assessments of a combination of:

- the actual or perceived risk of catching the disease;
- the effects of the disease on livestock;
- the cost of the vaccination relative to the value of the livestock (including the labour costs involved in the process); and
- the effect of the vaccine on the risk of catching the disease.

4.4 Market situation for livestock

4.4.1 Market chain for livestock in Phontong Custer

In the year 2008 in Phonthong zone there were 67 heads of buffaloes and 42 heads of cattle were sold. In the Phonethong zone there are about 5-10 traders, who usually come to collect cattle and buffalos. There are from difference levels of villages, district, other district and other province. Traders who come to collect cattle and buffalos in the zone spend a lot of time for walking because of difficulty traveling through tough road and remote areas. In wet season it is impossible to access by cars and each time traders who come to buy cattle in this season have to walk their cattle to Phonexay district. And there they load the cattle and buffalos on a truck and transport to sell in Loungprabang town.

Some occasions traders are able to collect many cattle and buffalos they also sell to Vientiane traders to transfer to Vientiane.

In fact, Phonthong zone there is no big animal slaughter to supply meat to local market. The animals will be slaughtered jus in case that animal die in accident such as: fall into a well, or stream, sickness and getting old.. The meat in local areas is cheap. The price per kg of meat is in average of 10,000-15,000 kip. But in most cases when animals were slaughtered the meat was shared among relatives.

4.4.2 Livestock trade

Although there is a regulation that traders have to pay a fee charge for trading in Phonthong zone such as for buffalo is 15,000 kip/head and cattle is 10,000kip/head but traders rarely pay to village committee. Traders will pay only in case that they are not allowed to move animals out of village. Farmers as sellers don't pay anything.

Table 4.4: Livestock trade in Phontong Custer

No	Livestock	Buffalo	Cattle
		Heads	Heads
1	Phontong	14	16
2	Na Ngoiy	12	0
3	Killai	6	10
4	Na Ngill	9	8
5	Bokham	15	0
6	Vungkhone	0	8
7	Viangchalein	11	0
Total		67	42

Cattle and buffalo market chain: In Phonthong, farmers sell animals to traders or middlemen, who usually come to village to collect animals for selling to the market in town. It's hard for farmers to bring their cattle and buffalo to sell in town and the reason for this is these farmers has small number of animals for sell and it is not worth to transport a few animal to the town, because the transport cost is expensive. So almost all farmers sell to collectors/middlemen who come from difference areas and levels e.g. small collectos from village level, district and provincial traders. There are also farmers who come to the areas in May- June to buy buffaloes for drafting purpose.

Farmers usually not to sell their animal in period of pregnancy but the time that they willing to sell is in dry season due to lack of forages and also in wet season due to high price because in wet season cattle gain a lot of weight and fat.

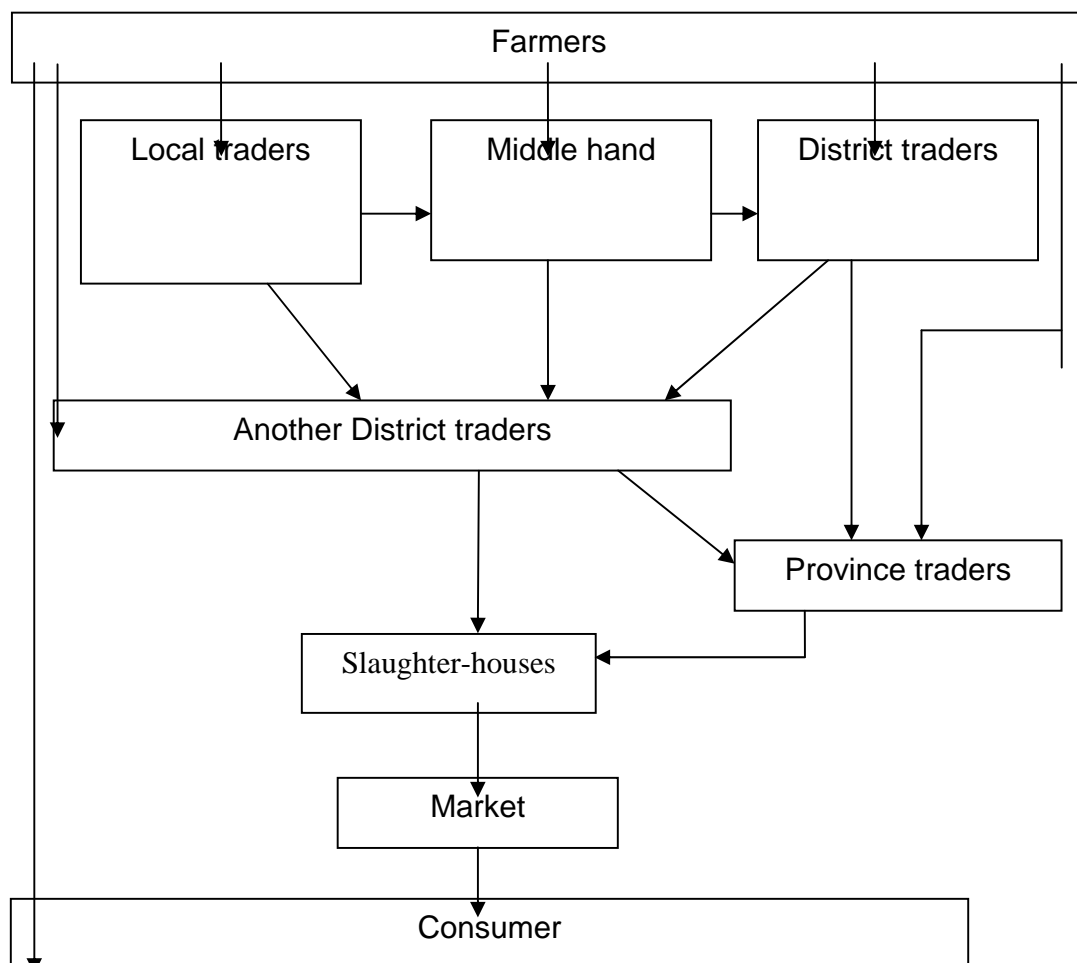


Figure 1. Market Chain for livestock in Phongsong Cluster

Based on data collection on price chain from famers and small local traders for cattle and buffalo; the price for living animal is determined by calculating in kg of estimating meat and the estimation has always done by traders and it is always lower than it should be. Zonal trader said: that from his experience the estimation of meat from a big bull age between 2-4 year old not more than 80 kg. And for buffalo age 4-6 year old highest meet estimation is 150kg/head. The price of kg meet of bull and buffalos are the same 30,000kip/kg.

The methodology estimation for trading between farmers and traders is and old method which have been practiced for a long time. This methodology is favored the traders, famers do not have any knowledge about how carcass estimation. However the only thing that farmers could do for bargaining on selling is compare to neighbors' animal shape and size which sold before them.

Animal selling by using weight both traders and farmers so far have not been practiced, so the old method will be continued to use. If there is no help to farmers in term of meat estimation, they will continue to lose in both bargain power and price.

However, to resolve this problem there is a need to find the right solution for both farmers and traders. One of the tools that can be useful is measure tape as it is cheap, simple and easy for traders to carry and farmers can see and use.

4.4.3 Price of livestock

Most prices of livestock depend on negotiation and bargaining among farmers and traders. Producers have limited accessing to market information. Farmers using sold price as a standard for selling and also compare to neighbors. However, even that the cattle or buffaloe from different farmers have the same weight, traders offer price to individual farmers differently as it depends on bargaining skill of each farmers and traders.

Weight estimation for selling depending on the agreement of buyers and sellers and farmers usually sells their livestock within the age of 4-6 years old. In these ages buffaloes weigh around 400-600 kg. For cattle, farmers mainly sold when they get to age between 2-4 years old with average weight for bull is 300-350 kg/head, cow 200-250kg/head.

The average price of cattle and buffalo in seven villages:.

Table 4.5 Price of animal

animals	Local trade (kip/head)	District trade (kip/head)	Province trade (kip/head)
buffalo	3.000.000 - 4.800.000	3.000.000 -5.000.000	3.000.000 - 5.500.000
Cattle	1.000.000 - 2.000.000	1.000.000 -2.200.000	1.000.000 - 2.500.000

When village collectors sell animals to district traders, they make a profit of 50,000-200,000kip/head. And if they sell to other district traders they could make a large profit up to 200,000-700,000kip/head

However if there is no trader come to collect in the village farmers would not be able to sell cattle and buffalos, because according to the regulation the one who want to buy and sell animals in big number they will need to have a license and to proceed as the following:

- Permission form district agriculture and forestry office and pay fees of 15.000kip/head (cow&buffalo)
- Permission from district finance office, buffalo 70,000kip/head cow 60,000kip/head
- District commerce office 10,000kip/time (document)
- Transportation for buffalo 100,000kip/head and cow 80,000kip/head

4.4.4 Market demand and supply

There were 170 cattle and 132 head of buffalo from 7 village custers of Phontong were supply to slaughterhouse in Luang Phabang town. Almost of livestock of Phontong custer provided 67 head of buffalo accounted for 39.4 percent and 42 cattle or 28 percent of total in Phonxay district. But the total demand of cattle was 1,068 head and 9,057 head of buffalo per year in Luang Phabang city.

CHAPTER V

CONCLUSION AND RECOMMENDATION

Conclusion

The research on food security through livestock production: case study at Phontong Custer, Phonsai district, Luang Phabang Province have objective include 1) socio-economics of the farmers 2) livestock production system at Phontong Custer 3) problems of livestock production by farmers and 4) Market situation for livestock.

- **Socio-economic characteristics of the farmers**

80 percent of the household heads are male with an average age of 42.4 years old, 64.4 percent of the household heads had education level primary school and lower, and the average number of members in each household is 5 persons. 97.7 percent of the household heads had the main occupation of being farmer. The average of the total cash income from agricultural activities was 3,405,041 kip. The average of the total cash income from livestock production was 4,635,400 kip. The average of total non-farm income was 2,307,476 kip. The average of total expenses for agricultural was 403,556 kip. The average of total expenses for non-farm activities in 2008 was 2,202,364 kip.

- **Livestock production system at Phonthong Custer**

There were two main raising systems used in livestock production were free range and semi-free range. Free range for whole year was found in Phontong, Na Ngoiy, Killai and Na Ngill village of Phontong Custer covered 92 households or 70.8 % of total households. Semi-free range was found in the other three villages of Bokham Vungkhon and Viengchalein of Phontong Custer covered 29.2 % or 38 households. Farmers in Phontong Custer raised local breed of cattle and buffalo, they can reach a mature weight of about 300-350 kg and tall 120-135 Cm for the male and 200-250 kg and tall 90-105 Cm for the female. In 2008, there were 594 heads of buffalo and 266 heads of cattle in Phontong Custer. The average of cattle number per household was 2.3 heads of cattle. And The average of buffalo number per household was 2.8 heads. There were 12 percent of increase rate by cattle and only 5 percent of buffalo. The main feed resources in Phontong zone are fodder trees and shrubs and natural grasses. There are 4 villages in the study area planted forage of animal in their land.

- **Problems of livestock production by farmers**

The main problems of livestock production such as Lack livestock production management, Animal health service provider have limited, Vaccine have a limited market, Small holder, farmers and extension workers have limited understanding of the animal health and Transportation is a significant constraint particularly to remote areas. Second problem was Techniques problem included local breed with low growth rate, low protein of natural grasses, animal detected diseases and range of animal have limited and third problem was diseases vaccination and treatment which was Haemorrhagic Septicemia and Foot and Mouth Disease.

- **Market situation for livestock**

In the Phonethong zone there are about 5-10 traders come to collect cattle and buffalos. There are difference levels of trader form the villages, district, other district and other province. Traders who come to collect cattle and buffalos in the zone they spent a lot of time for walking because of difficulty of tough road and remote. In wet season it is impossible to access by cars and each time traders who come to buy cattle in this season have to drive their cattle on foot to Phonexay district. From the Phonexay district they will be able to load the cattle and buffalos on a truck and transport to sell in Loungprabang town.

In the year 2008 in Phonthong zone sold buffalo about 67 heads and cattle or cows about 42 heads. For fee charge issue related to trading in Phonthong zone for buffalo is set 15,000 kip/head and for cow is 10,000kip/head but usually trader do not pay any fees to village organization so they lost fee income. Farmers usually not to sell their animal in period of pregnancy but the time that they willing to sell is in dry season due to lack of forages and also in wet season due to high price because in wet season cattle gain a lot of weight and fat.

Most prices of livestock are depending on negotiation and bargaining among farmers and traders. Producers have limited accessing to market information. The average price of animal were 3.000.000 - 4.800.000 kip per head of buffalo and 1.000.000 - 2.000.000 kip per head of cattle by local trader, 3.000.000 -5.000.000 kip per head of buffalo and 1.000.000 -2.200.000 kip per heads of cattle by District level and 3.000.000 - 5.500.000 kip per head and 1.000.000 -2.500.000 kip per heads of cattle by province level.

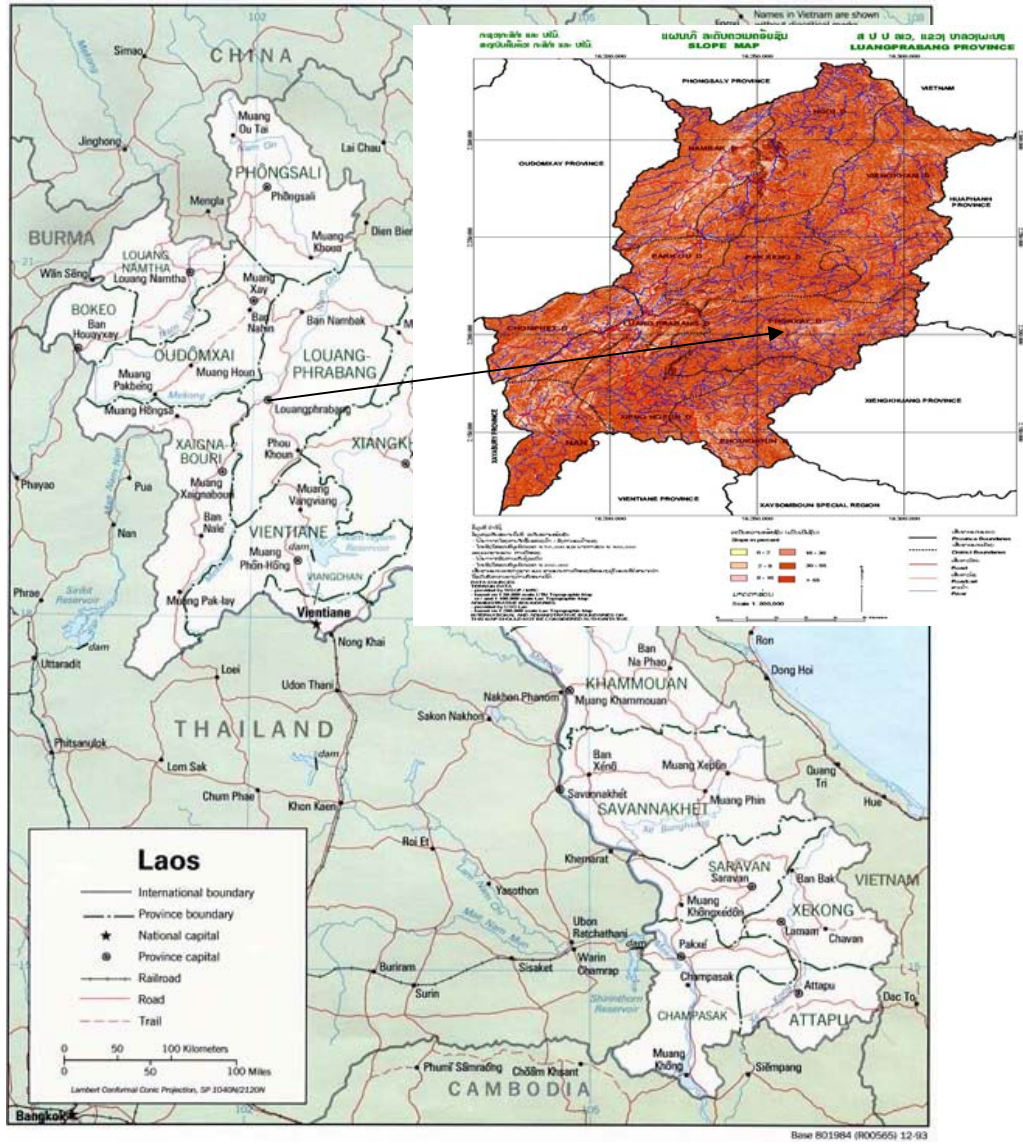
Recommandations

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APPENDICES

Research location



Phontong village



Na Ngoiy village



Killai village



Na Ngill village



VungKone village



APPENDICES

Simi free range



Free range



APPENDICES

Local breed



Livestock trade

