CHAPTER III

RESEARCH METHODS

This chapter will explain in detail regarding site selection, data collection method, and farmer selection. In addition, data analysis will be described, namely, characterization of integrated farming system, economic feasibility assessment and problem and constraints on evaluation of IRFS.

3.1   Site selection

This study would mainly focus on the *hai* system and integrated rubber-based farming system around the project site which is a target development area of L-SUARP. The study area is located in the Namo district, Oudomxay province in the northern part of Lao PDR where the integrated rubber + fruit tree + annual crops in hedgerow system was introduced by L-SUAFRP, since 2004, and also the rubber plantations are booming in overall areas, recently. In 2002, the target village's developments of L-SUAFRP were five villages, which are Namo Neua, Phouxang, Mixay, Pangdou and Pangthong.
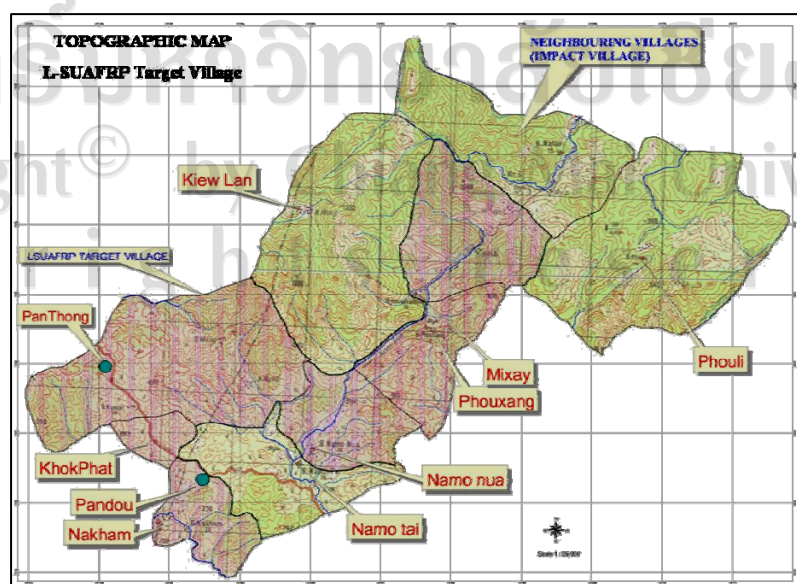

Figure 3.1 Location map of the study site and other L-SUAFRP

The study of this research was conducted in two villages, namely, Pang Dou and Pang Thong in order to improve the sustainable upland livelihood system through integrated participatory on-farm research.

3.2 Data collection method

This study was based on primary and secondary data. Secondary data consisted of documents, publication of projects, other relative organizations' information from journals, reports, proceedings and documents that dealt with agroforestry and upland agriculture system. Primary data were divided into three parts. The first part, the resource farmers were interviewed to gain more understanding about general information in the village, e.g. location, land use pattern, social economic status, farming system, etc. The second part was field observation to enable the understanding real situations of agricultural systems in village and to gain more knowledge on potential and problem in landscape e.g. soil characteristics, cropping pattern, farmer practices, water resource, and other relative information about location. (Figure 3.2)
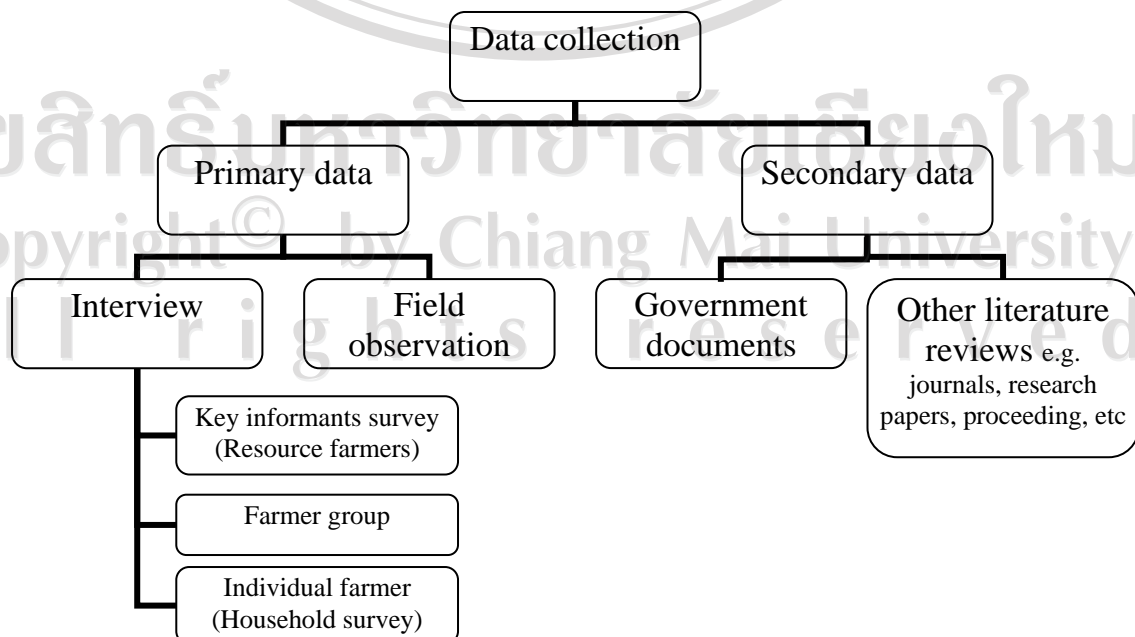
Figure 3.2 Diagram of data collection method

The third part dealt with individual household and farmers' group interviews, in order to determine the condition of adoption and/or non-adoption the new recommended practice.

Farmers interviews was organized by using the participatory rural appraisal (PRA) technique and tools. Farmer groups were invited to join in open participatory discussion about both different existing farming system practices, e.g. seasonal cropping calendar, input of farm management, problems that farmers were facing, resource mapping, and also knowledge of new farm practical experience and/or skills.

Household or individual farmer interviews were concerned on basic household information, such as land resource, land use (land holding, agricultural crop production), off-farm activity, labour force, family status, income source, farm expenditure, etc. Direct interviews and discussions with farmers through advantages, progress and constraints of integrated farming system practices, were included in data collection.

3.3   Farmer selection

This study emphasized on farmer groups which are practicing the three main patterns of agriculture systems, namely the *hai* system, as traditional practice, with dealt with only annual cropping, for home consumption (e.g. rice and/or maize, or other cash crops), and then the IRFS, like agroforestry practices, they included the rubber + annual crop (*IRFS 1*), and rubber + fruit tree + annual crop (*IRFS 2*). Farmers in Pangdou and Pangthong are the majority of tribal people who are living and using resources in the upland area. Consequently, by using the semi-structural interviews, 90 households' samples within two villages were randomly selected by

consideration of the three main patterns of agriculture system (Table 3.1). These household constituted approximately half of all villages' population.

Table 3.1 Number of selected farmers' household in study area

Farm system	Ban Pangdou	Ban Pangthong	Total
hai	23	23	46
IRFS 1	7	33	40
IRFS 2		4	4
Grand Total	**30**	**60**	**90**

Source: Field survey, May 2008

3.4   Data analysis

3.4.1   Characterization of integrated farming system

The majority of farming systems in study area were classified in three main types, base on field surveyed and consulted with resourced farmers. Qualitative assessment then was used to analyze data that obtained from PRA methods. In addition, SWOT analysis framework (strength, weakness, opportunity and threat) was also used to assess strengths and weaknesses of both farming system practices through consultation with farmers by using group discussion and individual farmer interview.

3.4.2.   Economic assessment

Both farming system practices, the *hai* system and IRFS, were assessed by comparing benefits and costs of each practice within three main types. The economic evaluation was done by calculating gross margin for annual crop production. Below are the relevant formula:

$$GM = GR - TVC \qquad \qquad \ldots\ldots \quad (1)$$

Where, $GR = \sum_{i}^{n} Y_i P_i$ \qquad \qquad \ldots\ldots \quad (2)

And $TVC = \sum_{i}^{n} VC_i C_i$ \qquad \qquad \ldots\ldots \quad (3)

$$GM = GR - TVC = \sum_{i}^{n} Y_i P_i = \sum_{i}^{n} VC_i C_i \qquad \ldots\ldots \quad (4)$$

Where,

GM	= gross magin;
GR	= gross revenue;
TVC	= total variable cost;
Y_i	= quantity of yield;
P_i	= price of crop yield;
VC_i	= quantity of variable cost; and
C_i	= cost of variable input

In addition, the long term benefit of integrated rubber tree production was evaluated by obtaining net present value (NPV), thus:

$$NPV = \sum_{t=1}^{T} \frac{NR^{t}}{(1+r)^{t}} - C_0$$

Where,

NR^t = net return in each year

r = interest rate (%)

C_0 = initial cost

t = year

To see the benefit of rubber farm by comparing to other annual crops, annual equivalent value (AEV) was calculated from the income for long term production of rubber farm using the fallowing formula.

$$AEV = \frac{NPV}{A_{t,r}} = \frac{NPV}{\dfrac{1-(1+r)^{-n}}{r}} = \frac{NPV \times r}{1-(1+r)^{-n}}$$

(Kemperer, 1996)

Where, $A_{t,r}$ = loan repayment factor

r = interest rate (%)

n = year

3.4.3 Problem and constraint to adoption of IRFS

Problem and constraints to adoption of the new recommended practices (IRFS) were identified qualitatively using data from questionnaires and PRA.