CHAPTER III

RESEARCH METHODOLOGY

3.1 Selection of the study areas

This study was conducted in two of the provinces adjoining the Cambodia-Thailand border, Battambang and Pailin, where there is more than 50,000 hectares of cassava area in each province, according to the Ministry of Forestry and Fisheries. The survey has determined that those who are part of an agro-ecological zoning, have many silos for storage and they export their cassava mainly to Thailand. Besides cassava as the main crop, the area cultivates maize, soybeans, mungbeans, and sesame.

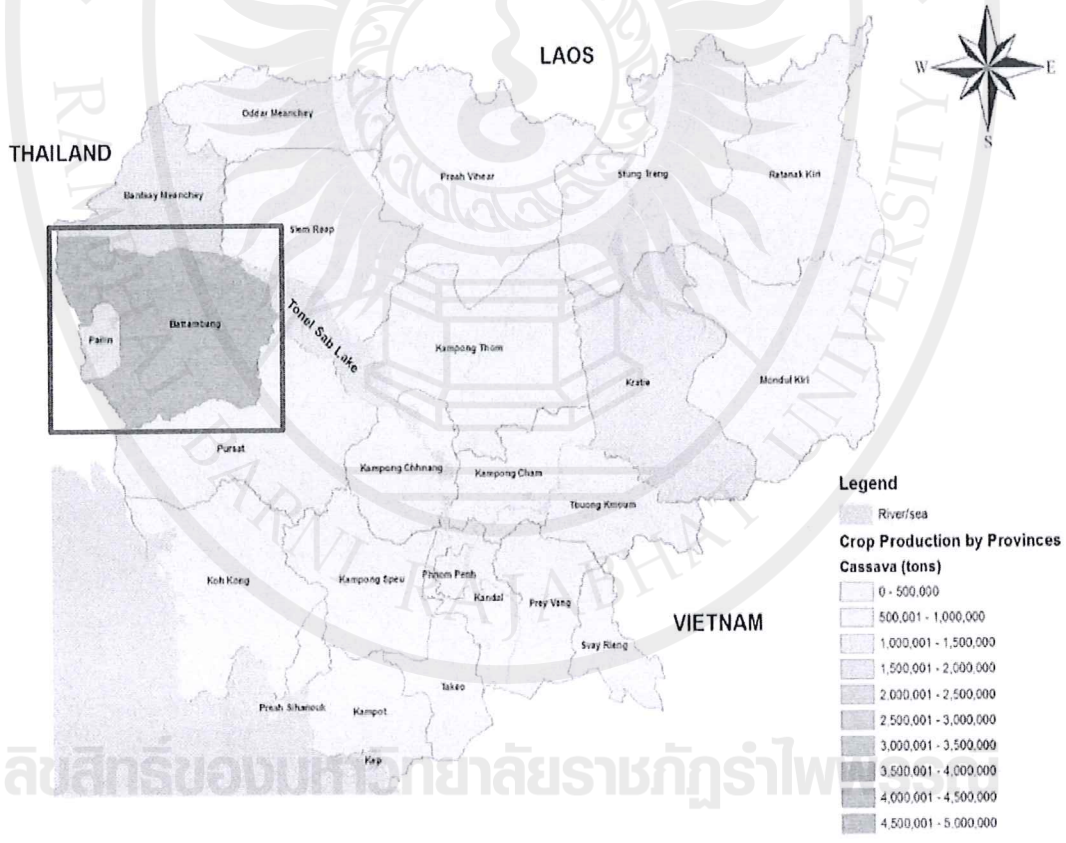

Figure 3.1 Study area (Battambang and Pailin province)

Source: MAFF, 2015

3.2 Sampling method

Sampling of cassava producers: A multi–stage sampling technique was used. Selected producer-respondents were chosen across the 3 districts, 3 communes and 6 villages in Battambang and Pailin province. A total of 109 cassava producer-respondents were chosen from a list collected of the village chiefs. Then a selection was used, from a random sampling technique with a sampling fraction of at least 10 percent.

The number of cassava producers-respondents in each commune was selected proportion to their numbers. The location of the samples for study has been selected according to Taro Yamane formula (created in 1967 & 1973) in terms of finite population. According to Taro Yamane formula, we can calculate the whole sample and sample selected by village as bellow:

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

Where:

N : total population

e^2 : standard error 10%

n : sample selected

N = 1,194 and e = 10 %

$$n = \frac{1{,}194}{1 + 1{,}194(0.1)^2}$$

n = 109 samples

For the numbers of household samples in each village, it is selected by using below formula:

$$n_i = \frac{n \times N_i}{N}$$

n_i : Number of household samples in each village

N_i: Number of total households in each village

n: Number of total household's samples

N: Number of total households in all villages

So, the numbers of household samples for interviewing in each target village is presented in the below as shown in Table 3.1.

Table 3.1 Number of household samples in each target villages

Provinces	Districts	Communes	Villages	Households	Households	
					Cultivated	Selection
Battambang	Sompovlun	Serei Mean Chey	OuKandal	455	308	28
	PhnomPhrek	PhnomPhrek	PhnomPhrek	901	350	32
Pailin	Salakrav	Salakrav	Phnomkuy	386	295	27
		OuAndoung	Ouchetbram	290	241	22
Total				**1,637**	**1,194**	**109**

Sampling of cassava traders: A total of 12 traders have been selected for the study: For each province of Battambang and Pailin: 6 silos were chosen from a list of agricultural technician department of Agriculture, Forestry and Fishery in the study area. The sample trader-respondents in the cassava marketing system were identified using the tracing method.

Input Suppliers: 6 input suppliers have been selected form 3 districts for the study, based on the sales of fertilizer and pesticide that the farmers have used in their cassava production. The tracing method was used.

Table 3.2 Sample respondents in cassava value chain

Actors		Sample Selected
Producers (Farmers)		109
Traders	Transporters/Collectors	6
	Silos	6
Input Suppliers		6
Group discussion		3
Total		**130**

3.3 Data collection

The study was conducted using a case study approach, which is one of two methods used for social science research. The data collection was from primary and secondary sources.

3.3.1 Secondary data

The secondary data is gathered from various sources: Ministry of Agriculture, Forestry and Fisheries (MAFF), Cambodia; the library of Rambhai Barni Rajabhat University (RBRU), Thailand; the library of Royal University of Agriculture (RUA), Cambodia. The journals, books, local villages and commune offices, relevant ministries and None Government Organization (NGOs), and finally from opinions of concerned sectors involved in the cassava value chain. Field trips were done to gather primary data well as secondary data.

3.3.2 Primary data

- The study was conducted using a case study approach, which is one of several methods of conducting social science research (Yin et al., 2009). Data collection was conducted with the aid of structured questionnaires (Fonji et al., 2017). Data relating to household characteristics (Mukete et al., 2018) came from a household survey, interviews with key informants and focus-group discussions with heads of household and actors in the cassava value chain.
- Primary data was collected from a sample of actors/stakeholders who are involved in the production, collection, and silo processing along the cassava value chain in both provinces.
- Data related to household characteristics came from a household survey. Interviews with key informants and focus-group discussions were done. Personal observations were made to gather information.
- To complement the survey, both primary and secondary data were collected from stakeholders who directly participated in the value chain. This includes the input providers, traders and processors. Both in-depth interviews using a semi-structured questionnaire and direct observation in the field were also applied in this study.

3.3.3 Research design

In this study are employed to get details and diverse information on the issues. The usage of these mixed methods also helps to triangulate the information which is gathered. With this, both quantitative and qualitative methods are used via household survey, Key information interviews (KII), and personal observation.

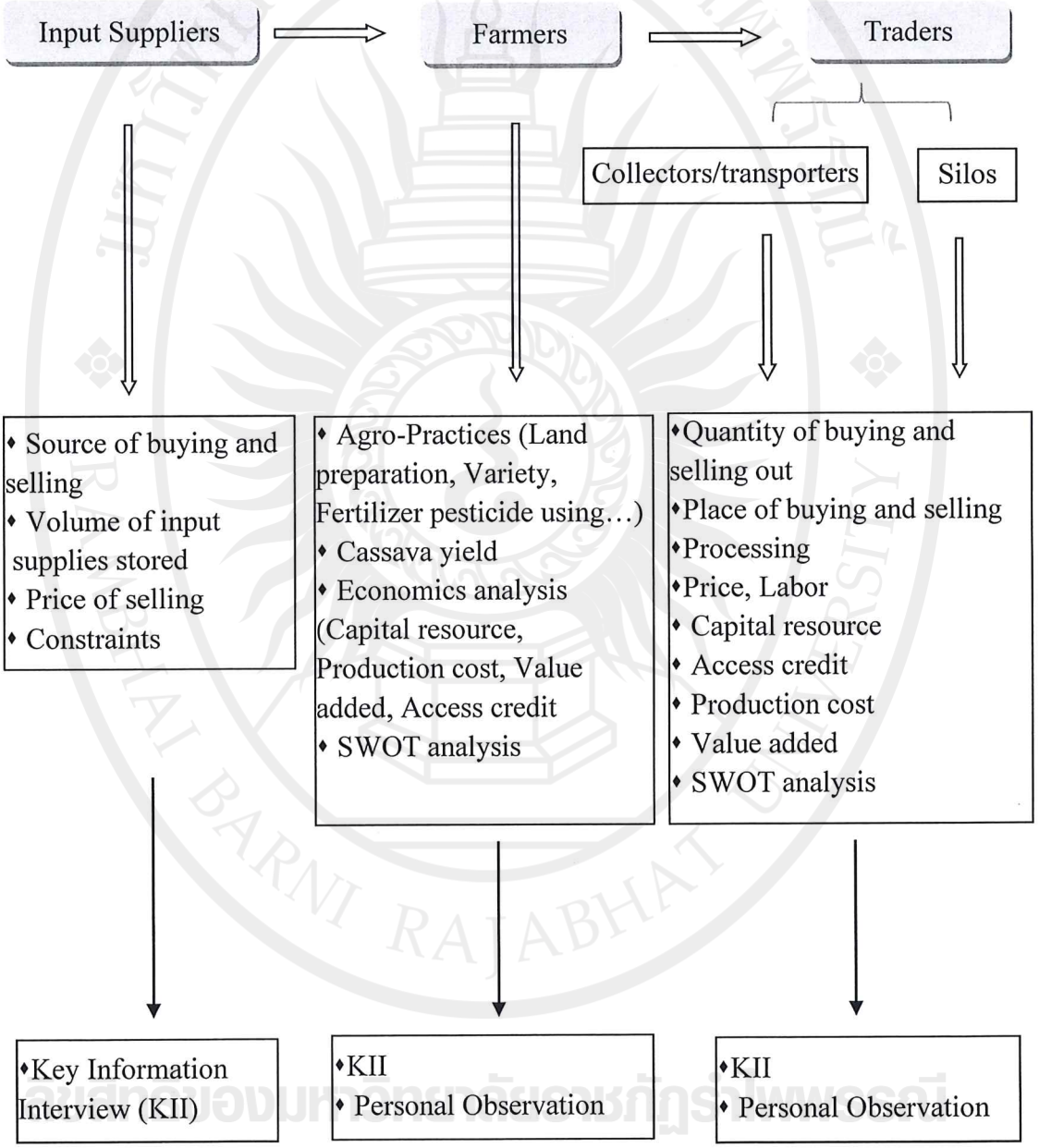

Figure 3.2 Three links in the research design on value chain

3.4 Data analysis

Both qualitative and quantitative methods of analysis were applied in this study to understand the roles and actions of the major actors. The analysis of the data from the questionnaire-based survey involved coding, data entry and analysis using the SPSS statistical program and Microsoft Excel.

The quantitative analysis, simple descriptive statistics such as mean, frequency, and percentages for agro-practices and demographic, agricultural economic data were used for the survey data gathered from sample farm households. SPSS and Microsoft Excel were employed to analyze the data. The analyzed data was presented using tables, graphs, and charts. Addition, the regression analysis was also conducted to examine with agro-practices significantly affect cassava yield as well as to investigate whether farmer's knowledge level represented by education level and farm experience has an influence on cassava yield.

The qualitative data from the in-depth interviews with stakeholders and focus group discussions were analyzed by specific content analysis. The purpose of this method was to identify and examine the most important topics (Masamha et al., 2018). A value chain details the many activities that are required to take a product or service through the different phases of production and then the delivery to the final consumers, and its disposal after use (Kaplinsky & Morris, 2001). The analysis of the cassava value chain was based on the value-chain analysis method (VCA) (Naziri et al., 2014). Value-chain upgrade solutions were computed in this study using a quantitative method. In analyzing the supply stages, the marketing and the trading relationships between actors, the chain analysis has become a key tool, since it can enable an understanding of the whole chain (Meaton et al., 2015).

This study identified major aspects of the cassava value chain at the Cambodia-Thai border province. The production cost, intermediate input (II), value added (VA) and other economic parameters, including gross profit (GPr), and net profit (NPr), (Purcell et al., 2008). These were evaluated based on specific actors' perspectives. Revenues were calculated according to the following equation:

Total Revenues (TR) = (Q × P) + income from by-products

Where TR= is the total receipts a seller can obtain from selling goods or services to buyers. It can be written as P × Q which is the price of the goods multiplied by the quantity of the sold goods. Q = quantity sold and P = price paid by buyer

Components of total value generated by the value chain such as output value (Y) and product value were also calculated using the Q × P formula, based on analytical frameworks for value chain analysis, proposed by international organizations such as Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ, 2007).

Value added (VA) was calculated to measure the new wealth created by a productive activity. And thus the creation of wealth and the contribution of the production process to the growth of the economy. VA was calculated according to the following equation:

$$VA = Y - II$$

Where: Y = total sales (output) value from production

II = intermediate input such as fertilizer, pesticide and seedlings.

Profit elements were calculated as follows:

GPr = VA – (wages and salaries + interest charges + taxes)

NPr = GPr – depreciation

GPr expresses the economic gain, or loss, to an actor once all current production costs have been met.

NPr indicates the economic gain or loss taking into account the predictable costs of actual investment.

Budgetary techniques analyzed such as Total cost and Breakeven Point (BEP) and profitability ratio were used to estimate the costs and returns of cassava production in the study area. Farm budgetary analyses enable the estimation of the total costs as well as total revenue accrued to the enterprise within a specific production period (Olukosi & Jenny, 1999).

Break Event Point

Total Revenue (TR) = Total Cost (TC)

Where:

$\Leftrightarrow P_1 \times Q_1 + P_2 \times Q_2 = TC$

$\Leftrightarrow P_1 \times Q_1 = TC-(P_2 \times Q_2)$

$\Leftrightarrow P1 = [TC-(P_2 \times Q_2)]/Q_1$

P_1 : Price of main product per unit

P_2 : Price of sub product per unit

Q_1 : Quantity of main product

Q_2 : Quantity of sub product

The Break-even analysis is a useful tool to study the relationship between fixed costs, variable costs, and returns. A break-even point tells us when an investment will generate a positive return and can be determined graphically or with simple mathematics. The Break-even analysis is divided in 2 types: one type is the price break-even point analysis (sales price varies but the total cost and yield per hectare is fixed). The other type is the yield break-even point analysis (the yield changes due to factors unrelated variable factors - fertilizers, fuel, labor, etc. -). So, the total cost per hectare and the price per ton are fixed.

Economic Efficiency/Benefit-cost ration or return investment

$E=TR/TC$

Where: E: Economic efficiency

TR: Total Revenue, $TR= P_1 \times Q_1 + P_2 \times Q_2$

TC: Total Cost, $TC = FC+VC$

Economics Efficiency: We want to know how much benefit they will get for each 1 KHR or 1 USD investment on the production.

A benefit-cost ratio (BCR) is an indicator showing the relationship between the relative costs and benefits of a proposed project, expressed in monetary or qualitative terms.

If a project has a BCR greater than 1.0, the project is expected to deliver a positive net present value to a firm and its investors.

If a project's BCR is less than 1.0, the project's costs outweigh the benefits, and it should not be considered.