CHAPTER III

RESEARCH METHODOLOGY

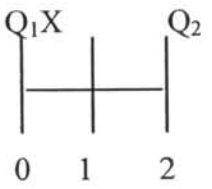
The study was located in Srinakorn district, Sukhothai province. The District covers 5 sub-districts with the total population of 21,025 residing in 6,350 households. About seventy-two percent of the total population or 4,550 households are agriculturists who use and handle pesticide chemicals (Srinakorn Agriculture Extension Office, 2005).

The total land area of Srinakorn district is 124,887.50 rai (one rai = 0.4 acre) in which 100,873 rai (80.77% of the total land area) have been developed for cultivated land. There are many types of agriculture product grown in this area, for example, rice, sugar cane, beans, watercress, chili, mango, orange, and watermelon (Srinakorn Agriculture Extension Office, 2005).

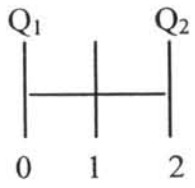
3.1 Research Design

This study used a quasi-experimental research design to examine the effectiveness of the participatory learning program on knowledge, attitude, and practices (KAP) of pesticide utilization among the agriculturists in Srinakorn district, Sukhothai province. The sample consisted of an experimental group, who attended a participatory learning program on the safe use of pesticide, and a control group, who did not attend this program. The research design was as follows:

Experimental group



Control group



X	indicates the different aspect of participatory learning program on the safe use of pesticide.
Q_1	indicates the assessment of **KAP** for safe use of pesticide (pre-test) among samples in both experimental and control groups before program implementation.
Q_2	indicates the assessment of **KAP** for safe use of pesticide (post-test) among samples in both experimental and control groups after program implementation.

3.2 Study Population

The target population of this research was the agriculturists who lived in Srinakorn district, Sukhothai province.

3.3 Study Sample

3.3.1 Sample Size

The equation used for calculated the sample size was as follow;

$$n = \left[\frac{Z_{1-\alpha/2}\,\sigma_0 + Z_\beta\,\sigma_1}{(\mu_1 - \mu_0)} \right]^2 \quad \text{..... (Daniel, 2005)}$$

n = the number of sample size in each group

$Z_{1-\alpha/2}$ = standard score for Type I error (α=.05) = 1.96

Z_β = standard score for type II error (β = 0.2) = 0.845

σ_0 = variance of pre-test score

σ_1 = variance of post-test score

μ_0 = mean of pre-test score

μ_1 = mean of post-test score

Table 2: The result KAP score form study of Srikam (2001)

Variable	Full score	Pre-test		Post-test		$\left[\frac{Z_{1-\alpha/2}\,\sigma_0 + Z_\beta\,\sigma_1}{(\mu_1 - \mu_0)} \right]^2$
		Mean	S.D.	Mean	S.D.	
Total knowledge score	11	6.16	2.19	10.74	2.95	11
Total attitude score	24	19.46	2.63	20.36	2.3	310
Total practice score	30	23.26	3.21	27.04	2.73	37

Table 3: The result KAP score form study of Pitasawad (2003)

Variable	Full score	Pre-test		Post-test		$\left[\frac{Z_{1-\alpha/2}\,\sigma_0 + Z_\beta\,\sigma_1}{(\mu_1 - \mu_0)} \right]^2$
		Mean	S.D.	Mean	S.D.	
Total knowledge score	20	13.33	2.63	18.73	1.04	5
Total attitude score	40	32.24	4.7	38.85	1.64	34
Total practice score	42	23.42	5.56	35.48	4.27	30

From the calculation tables above, the sample size equal to 37 households was the most appropriate for this study. Since there might be some lost to follow up, the sample size was increased by 10% from calculated sample size. The sample size was 41 households from each group, experimental group and control group. Therefore, the total sample size was 82 households (one subject per household).

3.3.2 Sampling technique and sample selection

The research area was selected by using the following steps: (Figure 3)

Process 1: Sampling of districts

Sukhothai Province was divided into 9 districts. Srinakorn district was selected by using the purposive sampling. According to this study used the participatory concept, then, it should have the stakeholders: Srinakorn District Health Officer, Srinakorn District Hospital, Srinakorn Agriculture Extension Office, Health Center, Sukhothai Land Development Office, Village Headman, and Village Health Volunteers, that would like to participate and could support the study. Since the researcher used to work in Srinakorn district, it has had the connection between researcher and stakeholders already. Therefore, it increased the potential and convenient of this study.

Process 2: Sampling of sub-districts

Srinakorn district was divided into 5 sub-districts. Two sub-districts, Nongbua sub-district and Khlongmaplab sub-district, were selected by using the

purposive sampling according to the similarity of cultivated land and be the area with all year round growing the croup. Moreover, two sub-districts had the potential in term of the human resources (health staff team) and the budget to support this study. Also, there were the stakeholders that ready to participate in this study

Nongbua sub-district was selected to be the experimental group because this sub-district had more potential in term of the human resources (health staff team) than Khlongmaplab sub-district. Moreover, this district also supported the budget from Nong-bua Primary Care Unit. Thus, Khlongmaplab sub-district was selected to be the control group.

Process 3: Sampling of households

There were 741 households in Nongbua sub-district and 1,568 households in Khlongmaplab sub-district. The total sample size, 82 households (41 households from each sub-district), was selected by using the proportional sampling. The result of household random sampling was shown in table 4 as follow;

Process 4: Sampling of subjects

In both the experimental group and the control group, the subject was selected to be the representative of household (one subject per household) by using simply random sampling under the criteria as follow;

Table 4: The proportional sampling of households

Village	Nongbua sub-district		Proportional sampling	Number of household	Khlongmaplab sub-district		Proportional sampling	Number of household
	Population (Total)	Household (Total)			Population (Total)	Household (Total)		
1	415	98	5.4	5	544	127	3.3	3
2	346	86	4.8	5	815	150	3.9	4
3	299	64	3.5	4	940	210	5.5	6
4	686	162	9.0	9	518	114	3.0	3
5	218	58	3.2	3	620	132	3.5	4
6	263	67	3.7	4	1076	241	6.3	6
7	245	59	3.3	3	772	150	3.9	4
8	666	147	8.1	8	643	129	3.4	3
9					759	155	4.1	4
10					553	160	4.2	4
Total	3,138	741	41.0	41	7,240	1,568	41.0	41

- must be the agriculturists who grow plants, vegetable, or fruits and use pesticide.
- must be over 15 years old and not more than 65 years old
- must be willing to participate in this study

All subjects signed an informed consent to indicate their willingness to participate in this study. During implementation in the experimental group, the subject excluded from this study should be under the criteria of:

- Sickness
- Absent at least one time from the participatory learning program.
- Need to leave from this study.

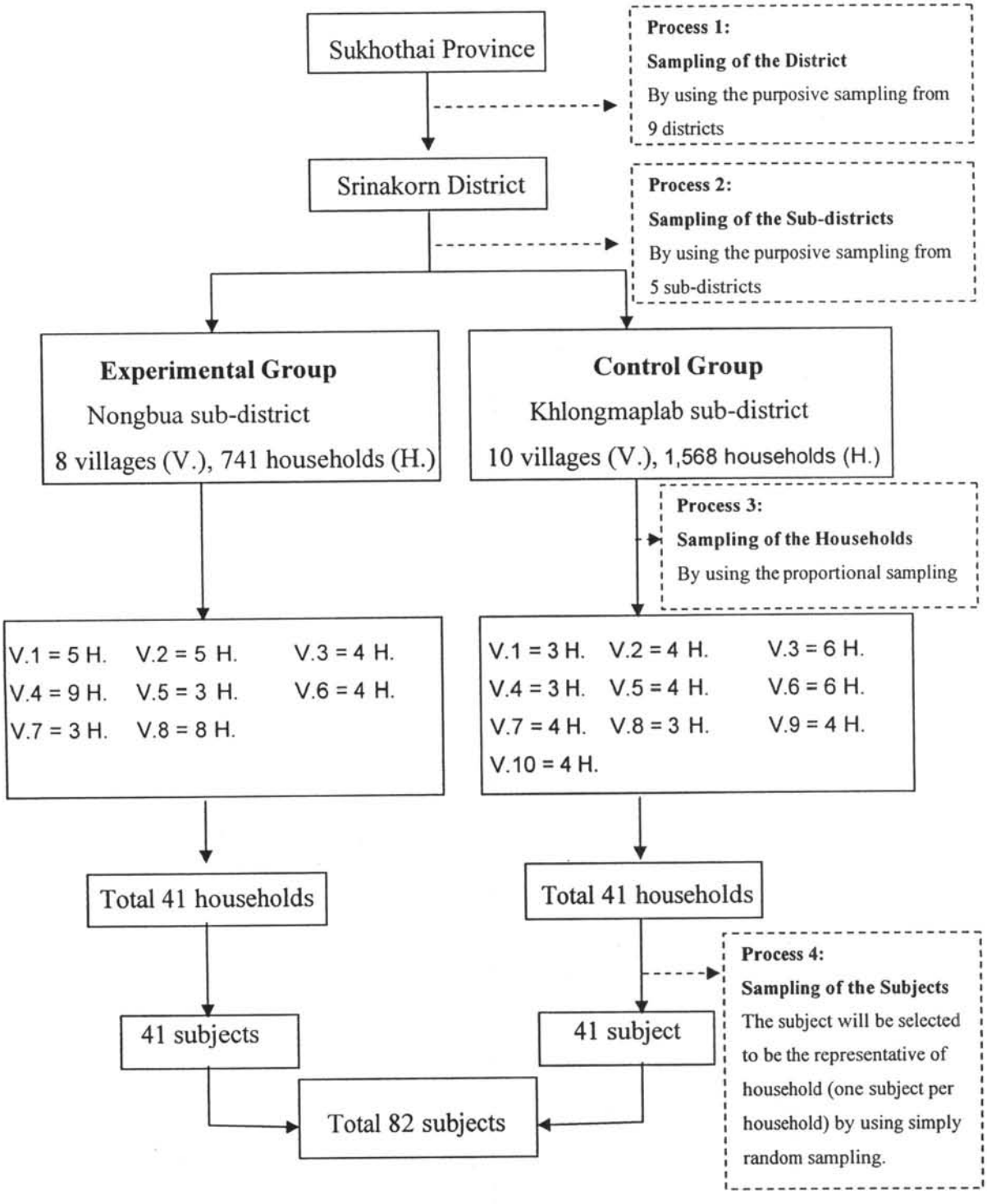


Figure 3: Diagram of sampling technique

3.4 Research Procedure

This research study applied the concept of participatory learning on the safe use of pesticide among the agriculturists in Srinakorn district, Sukhothai province. The study consisted of 3 phases; preparatory phase, pre-implementation phase, and implementation phase.

3.4.1 Preparatory phase. During this phase, the researcher had prepared the community in various aspects; building connections, selecting stakeholders and communities, studying the baseline data and pesticide used in the community. About three months was used for this preparatory phase; for doing the following activities:

- Building connection

This activity was aimed to build the connection among the stakeholders who could come to participate in this study. The stakeholders were not only the bureau that responded and related to the people who live in the community in term of pesticide used but also were the community leaders. The selected stakeholder in this study consisted of Srinakorn District Health Officer, Srinakorn District Hospital, Srinakorn Agriculture Extension Office, Nongbua Health Center, Khlongmaplab Health Center, Sukhothai Land Development Office, Village Headman, Village Health Volunteer, and the villagers.

- Community study

This activity was aimed to create the acquaintance and to understand the baseline data of the community including characteristics/site of the community, history, population structure, political, economics, community power, social & culture, and health. Information was collected through observation and asking the stakeholders.

- Situation of pesticide utilization

This activity concerned with the information related to the pesticide used problems. This factual information was collected by studying the report and asking the stakeholders.

3.4.2 Pre-implementation phase. In this phase, the subjects were recruited to participate in this study. Then, the researcher and the stakeholders participated in preparing the participatory program activities which composed of: recruiting the participants, assessing the need among the stakeholders, designing the pattern of participatory learning program, identifying the responsible person for each activity, and preparing training materials and instruments. This phase took about two weeks. The detailed activities were presented as follow:

- Participants recruitment

This activity was aimed to recruit the subjects who could participate in the participatory learning program. This phase started by arrange the village health

volunteer meeting at Nongbua Health Center. In the meeting, the research informed the village health volunteers the detail of the participatory learning program. Then, let them invited the agriculturists who would like to joint the participatory learning program by signing an informed consent to indicate their willingness to participate in this study. Afterward, the researcher selected the subjects from the total willingness agriculturists by using sample random sampling until got the subject equal the 41 subjects. In control group, Khongmaplab sub-district, also recruited the participants using the same method as in experimental group.

- Community needs assessment

This activity was aimed to determine the need of the stakeholders: Village Headmen, Village Health Volunteers, and the subjects who participated in the participatory learning program, via brainstorming by arranging the meeting in the community. The researcher started the meeting and, then, let the stakeholders presented and exchanged the experience in term of pesticide used that had occurred in the community. Later, the research let them analyzed and identified the problem by using the criteria such as size of the problem, severity, difficulty/easy, and interest of the community. Afterwards, the research asked the stakeholders to decide which information should be added to the participatory learning program.

- Implementation design

This activity was aimed to have the stakeholder: Srinakorn District Health Officer, Srinakorn District Hospital, Srinakorn Agriculture Extension, and

Sukhothai Land Development Office, via brainstorming in order to identify activities in the participatory learning program. The research asked the stakeholders to identify one responsible person to be the trainer for each activity in the program. Then, the research made the action plan by presenting the agreement chart and asked the stakeholders reviewing and revising the action plan. In addition, before the implementation phase, the research recruited the research assistant and had conducted the trainer meeting for one day to set up and to develop a training program.

- Preparation of training materials and instruments

Materials and equipment for the training program were prepared including papers, pens, pencils, and games' equipment. The instruments used for data collection such as questionnaires, training schedules, blank forms for participation' registration, a camera, and a notebook, were prepared.

3.4.3 Implementation phase. This phase involved with the implementation of the action plan by the responsible stakeholders in the participatory learning program. It also included the activities concerning the pre-test and post-test evaluations. This phase had taken for 3 weeks.

- Pre-test evaluation

This activity was aimed to evaluate knowledge, attitudes, and practices of the subjects in experimental group and control group by using the questionnaire, before implemented the participatory learning program.

- Participatory learning program

This activity was aimed to apply the participatory learning program among the recruited subjects who live in Nongbua sub-district, Srinakorn district, Sukhothai province. The activities of the participatory learning program were followed the schedule planed in pre-implementation phase. The activities of program had implemented for 2 days.

The trainers implemented the activities as planned schedule. While each trainer was implementing the activities in accordance with the plan, the researcher and the researcher assistants monitored the activities by coordinating closely with each trainer every module set in the schedule in order to coordinate the group activities, to resolve some problem/obstacles occurred and to assess the results of the implementation.

- Post-test evaluation

This activity was aimed to evaluate knowledge, attitudes, and practices of the subjects in experimental group and control group by using the questionnaires, two weeks after implemented the participatory learning program.

3.5 Research Instrument for Data Collection

The questionnaires used in the project were modified and adjusted from the questionnaires of Lojananont (2001) to suit this particular study. Lojananont's questionnaires had already reviewed for accuracy of language use and content validity

by a team of qualified senior professionals prior to a try out with a pilot group of 30 agriculturists whose main characteristics were similar to the target. Questionnaires were examined and analyzed for their reliabilities. [USED both pre- and post-Q]

The reliability coefficient of right health attitude (reliability = 0.7411), and self-care behavior, environment and consumers protection practice (reliability = 0.6582) was found out by using the formula coefficient of Cronbach's alpha. The reliability coefficient of knowledge and understanding factor from using pesticide (reliability = 0.6578) was found out by using the formula K-R_{21} of Kuder Richardson.

K-R_{21} is appropriate for scales with items which are answered dichotomously, such as "true-false", "yes-no", "present-absent", and so forth. On the other hand, Alpha of Cronbach is an extension of K-R_{21}, allowing it to be used when there are more than two response alternatives (Streiner & Norman, 2003).

The questionnaires contained four main parts as follows:

Part 1: General data

Interviewee's general data collected include name, gender, age, marital status, highest education level, duration in agriculture occupation, characteristic of occupied area, sizes of plantation, type of cultivated plants, income from cultivatable plant, and frequency of pesticide application per month.

Part 2: Knowledge of pesticide utilization

This part consisted of knowledge and understanding about right pesticide-used method which started from pre-use, using and the result after using. The total of question in this part was 15 questions. The question had 4 multiple-choice answers. The answers were scored as follow;

Correct answer obtaining	1	score
Incorrect answer obtaining	0	score
Missing answer obtaining	0	score

Possible scores were ranged between 0-15 points. A mean score and standard deviation of the group were used to classify subjects into 3 groups as follow: (Srisa-ard, 1992; Suchat, 1997)

Good level	: scores > Mean + S.D.
Moderate level	: scores = Mean ± S.D.
Low level	: scores < Mean - S.D.

Part 3: Right health attitude of pesticide utilization

The instrument for health perception was divided into 3 sections: (1) attitude toward the using pesticides, (2) attitude toward the seriousness in using pesticide, and (3) attitude toward the benefits of taking action and barriers to take action in using pesticides.

The total of question in this part was 31 questions. The questionnaire form consisted of expression, opinion, belief, and agriculturist's attitude. The questions

were both positive and negative. Each question was scored on a five-point Likert scale, strongly agree, agree, uncertain, disagree, and strongly disagree. All of them had the meaning as follows:

Strongly agree meant agriculturist thought that the message was coincide with his feeling, opinion or belief following his perception the most.

Agree meant agriculturist thought the message was coincide with his feeling, opinion or belief following his perception.

Uncertain meant agriculturist was uncertain with the message in that sentence which was coincided or against his felling, opinion or belief with perception.

Disagree meant agriculturist thought the message opposed his feeling opinion or belief with perception.

Strongly disagree meant agriculturist thinks the message opposes all of his feeling, opinion or belief with perception.

Rate scale

The target group could choose one choice and the criteria of measurement was as follow,

	Positive attitude	Negative attitude
Strong agree	4	0
Agree	3	1
Uncertain	2	2
Disagree	1	3
Strongly disagree	0	4

Possible scores were ranged between 0-124 points. A mean score and standard deviation of the group were used to classify subjects into 3 groups as follow: (Srisa-ard, 1992; Suchat, 1997)

Good level : scores > Mean + S.D.

Moderate level : scores = Mean ± S.D.

Low level : scores < Mean - S.D.

Part 4: Safe use of using pesticides

This part is the study of self-care behavior, environment and consumer protection from using pesticides and was divided into 3 sections: (1) the questions of self-care practice in personal health, (2) the questions of self-care practice in using personal protection equipment, and (3) the questions of practice related to environmental care and consumer protection. The total of question in this part was 25 questions.

The subject had to choose one answer from each question on a four-point Likert scale (always done, often done, sometimes done, and never done). All of them had the meaning as follows:

Always done meant agriculturist performs the dangerous protection activities from pesticides every time when his work related pesticides.

Often done meant agriculturist almost performs the dangerous protection activities from pesticides when his work related pesticides or the amount of doing activities are between 6-9 times from 10 times for using pesticides.

Sometimes done meant agriculturist sometimes performs the dangerous protection activities from pesticides when his work related pesticides or the amount of doing activity is not over 5 from 10 times for using pesticides.

Never done meant agriculturist never performs the dangerous protection activities from pesticides every time when his work related pesticides.

Rate scale

The target group could choose one choice and the criteria of measurement was as follow,

	Positive practice	Negative practice
Always done	3	0
Often done	2	1
Sometimes done	1	2
Never done	0	3

Possible scores were ranged between 0- 75 points. The classification was performed using a mean score and standard deviation of the group. The subjects were classified into 3 groups based on the following practice scores: (Srisaard, 1992; Suchat, 1997)

Good level : scores > Mean + S.D.

Moderate level : scores = Mean ± S.D.

Low level : scores < Mean - S.D.

3.6 Data Collection

Data collection process of this research had the details as follows:

1. Researcher took the letter to explain the objective of research from the College of Public Health, Chulalongkorn University to Srinakorn District Health Office, Srinakorn Hospital, Srinakorn Agriculture Extension Office.

2. The research assistants were trained for right understanding of the questions and data collection process.

3. The interview technique following the questionnaire was used to collect the data by the researcher and research assistants. Since most subjects (agriculturists) were not well educated and may have a difficulty reading questions on their own. Advantages of this technique are that the interviewer has opportunities to reword, redirect, or further clarify unclear questions to make subjects better understand what are being asked and give appropriate responses. Also, this technique can be used with almost any type of population such as children, handicapped, illiterate, or the elderly. A disadvantage of using the interview is that interviewers must not be bias and influence subjects to answer one way or another. The interviewers went through the questionnaire on question at a time and recorded appropriate responses. The expected time of each interview was about 20 minutes.

3.7 Data Analysis

The data from the questionnaires was encoded and saved in notebook. Then, a data analysis was performed.

Statistics for data analysis:

1. Descriptive statistics including frequencies and percentages were used for demographical data, and occupational data. Mean and Standard deviation (S.D.) were used for score of knowledge, attitude, and practice of pesticide uses.

2. Inferential statistics (chi-square, *t*-test, and paired-*t* test) were used to evaluate differences of characteristics between experimental and control groups and to evaluate changes of participants' knowledge, attitude, and practice within two-week period.

3.8 Ethical Issues

In the implementation, all subjects were informed about risks and confidentiality in participatory in the study. They all were aware of the type of information being collected, why information were being sought, what purpose was the study for, how they were expected to participate in the study, and how it would directly or in directly affect them. Then, everyone who would be willing to participate would sign and informed consent.

After reported implementation, results of this study would be reported to the stakeholders in both experimental and control groups. In addition, the researcher is willing to create and conduct another PLP for participants in the control group if they wish.