ความรู้ ทัศนคติ และการปฏิบัติตนต่อการใช้อุปกรณ์ป้องกันตัวส่วนบุคคล สำหรับเกษตรกรผู้ปลูกพริก ในตำบลหัวเรือ อำเภอเมือง จังหวัดอุบลราชธานี ประเทศไทย

นางสาวเสาวนีย์ หน่อแก้ว

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาสาธารณสุขศาสตรมหาบัณฑิต
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KNOWLEDGE, ATTITUDE, AND PRACTICE (KAP) OF USING PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR CHILLI-GROWING FARMERS IN HUARUA SUB-DISTRICT, MUEANG DISTRICT, UBONRACHATHANI PROVINCE, THAILAND

Miss Saowanee Norkaew

A Thesis submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Public Health Program in Public Health
College of Public Health Sciences
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Academic Year 2009

Thesis Title	KNOWLEDGE, ATTITUDE, AND PRACTICE (KAP) OF USING PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR CHILLI-GROWING FARMERS IN HUARUA SUB-DISTRICT, MUEANG DISTRICT, UBONRACHATHANI PROVINCE, THAILAND
By	Miss Saowanee Norkaew
Field of Study	Public Health
Thesis Advisor	Wattasit Siriwong, Ph.D.
Thesis Co-Advisor	Professor Mark Gregory Robson, Ph.D.

Accepted by the College of Public Health Sciences, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master's Degree

.....Dean of the College of Public Health Sciences

(Professor Surasak Taneepanichskul, M.D.)

THESIS COMMITTEE

.....Chairman

(Associate Professor Somrat Lertmaharit,M.Sc., M.Med.Stat.)

.....Thesis Advisor

(Wattasit Siriwong, Ph.D.)

.....Thesis Co-Advisor

(Professor Mark Gregory Robson, Ph.D., M.P.H.)

.....External Examiner

(Sumana Siripattanakul, Ph.D.)

เสาวนีย์ หน่อแก้ว : ความรู้ ทัศนคติและการปฏิบัติตนต่อการใช้อุปกรณ์ป้องกันตัวส่วนบุคคล สำหรับเกษตรกรผู้ปลูกพริก ตำบลหัวเรือ อำเภอเมือง จังหวัดอุบลราชธานี ประเทศไทย (KNOWLEDGE, ATTITUDE, AND PRACTICE (KAP) OF USING PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR CHILLI-GROWING FARMERS IN HUARUA SUB-DISTRICT, MUEANG DISTRICT, UBONRACHATHANI PROVINCE, THAILAND) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: อ.ดร.วัฒน์สิทธิ์ ศิริวงศ์ อ.ที่ปรึกษาวิทยานิพนธ์ร่วม: ศ.ดร.มาร์ค เกรกอรี รอบสัน, 100 หน้า

การใช้สารกำจัดศัตรูพืชในประเทศไทยก่อให้เกิดความตระหนักในปัญหาต่อสิ่งแวดล้อมและสุขภาพ โดยเฉพาะอย่างยิ่งสารกำจัดศัตรูพืชมีการใช้อย่างมากในการปลูกพริก จุดประสงค์ของการศึกษานี้ (1) เพื่อประเมินความรู้ ทัศนคติ และการปฏิบัติต่อการใช้อุปกรณ์ป้องกันตัวส่วนบุคคล สำหรับเกษตรกรผู้ปลูกพริกในการป้องกันตัวเองจากสารกำจัดศัตรูพืช (2) เพื่อประเมินความรู้ ทัศนคติ และการปฏิบัติในการใช้และการได้รับสัมผัสสารกำจัดศัตรูพืช และ (3) เพื่อเสนอข้อแนะนำและแนวทางเพื่อลดการได้รับสัมผัสสารกำจัดศัตรูพืชในเกษตรกรผู้ปลูกพริก ในตำบลหัวเรือ อำเภอเมือง จังหวัดอุบลราชธานี ประเทศไทย โดยทำการสัมภาษณ์แบบตัวต่อตัวกับเกษตรกรผู้ปลูกพริกจำนวน 330 คน ผลการศึกษาพบว่า 53% ของผู้ถูกสัมภาษณ์เป็นเพศชาย และ 39.6% ของผู้ถูกสัมภาษณ์อยู่ในกลุ่มอายุระหว่าง 31 ถึง 40 ปี ผู้ถูกสัมภาษณ์ 71.2 % จบการศึกษาระดับประถมศึกษา ผู้ถูกสัมภาษณ์ส่วนใหญ่ทำการผสมและฉีดพ่นสารกำจัดศัตรูพืชด้วยตัวเอง 89.4% ของผู้ถูกสัมภาษณ์ทราบว่าขณะฉีดพ่นสารกำจัดศัตรูพืชต้องสวมหน้ากาก รองเท้าบูท และสวมใส่เสื้อผ้ามิดชิด และ 83.3% ทราบว่าสารกำจัดศัตรูพืชสามารถเข้าสู่ร่างกายได้ 3 ทาง คือทางปาก, ผิวหนังและการหายใจ 45.5% ของผู้ถูกสัมภาษณ์ทราบว่าต้องสวมอุปกรณ์ป้องกันตัวส่วนบุคคลแม้ขณะฉีดพ่นสารกำจัดศัตรูพืชเหนือลม ผู้ถูกสัมภาษณ์ส่วนใหญ่ตรวจสอบเครื่องมือก่อนใช้ทุกครั้ง และสวมใส่เสื้อผ้ามิดชิดขณะฉีดพ่นเป็นประจำ อย่างไรก็ตาม 77.2 % ของผู้ถูกสัมภาษณ์ มีความรู้เกี่ยวกับการใช้อุปกรณ์ป้องกันตัวส่วนบุคคลในการป้องกันตัวจากสารกำจัดศัตรูพืชอยู่ในระดับต่ำ 54.5 % มีทัศนคติที่ไม่เหมาะสมเกี่ยวกับการใช้อุปกรณ์ป้องกันตัวส่วนบุคคลในการป้องกันตัวจากสารกำจัดศัตรูพืช และ 85.0 % ของผู้ถูกสัมภาษณ์มีการปฏิบัติต่อการใช้อุปกรณ์ป้องกันตัวส่วนบุคคลอยู่ในระดับปานกลาง จากการทดสอบความสัมพันธ์ระหว่าง ความรู้กับทัศนคติ ความรู้กับการปฏิบัติ และทัศนคติกับการปฏิบัติ พบว่า มีความสัมพันธ์กันทางบวกในระดับต่ำ (ค่าสัมประสิทธิ์ความสัมพันธ์ตามตำแหน่งของสเปียร์แมน 0.216, 0.285, และ 0.305ตามลำดับ, *p-value* < 0.001) การศึกษานี้เสนอให้หน่วยงานของรัฐบาลและชุมชนควรมีคำแนะนำมาตรการ และแนวทางที่เหมาะสมเพื่อการป้องกันผลกระทบต่อสุขภาพจากการได้รับสัมผัสสารกำจัดศัตรูพืชของเกษตรกรในพื้นที่นี้ต่อไป

สาขาวิชา : สาธารณสุขศาสตร์ ลายมือชื่อนิสิต: SAO WANEE NORKAEW

ปีการศึกษา : 2552 ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก:

ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์ร่วม:

5279120353 : MAJOR PUBLIC HEALTH
KEYWORDS : KNOWLEDGE/ ATTITUDE/ PRACTICE/ PESTICIDE/ PERSONAL PROTECTIVE EQUIPMENT

SAOWANEE NORKAEW: KNOWLEDGE, ATTITUDE, AND PRACTICE (KAP) OF USING PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR CHILLI-GROWING FARMERS IN HUARUA SUB-DISTRICT, MUEANG DISTRICT, UBONRACHATHANI PROVINCE, THAILAND. THESIS ADVISOR: WATTASIT SIRIWONG, Ph.D., THESIS CO-ADVISOR: PROF. MARK GREGORY ROBSON, Ph.D., 100 pp.

A significant pesticide use in Thailand has increased concerns about potentially adverse effects on human health and environment. Particularly, a number of pesticide products have been heavily applied in chilli farms. This study aims (1) to assess the knowledge, attitudes, and practices on using personal protective equipment of chilli-growing farmers to protect themselves from pesticides, (2) to evaluate the knowledge, attitudes, and practices associated with pesticide use and exposure in the chilli-growing farmers, and (3) to provide the recommendations and guidelines to reduce the farmers exposure to pesticides in Hua Rua sub-district, Muang district, Ubonratchathani Province, Thailand. A standardized questionnaire was completed by face to face interviewing from 330 chilli-growing farmers. The results showed that 53% of the participants were male and 39.6% and their ages were in the range of 31-40 years. Of 71.2 % had educated in primary school. Most of them were applied pesticides by themselves. Almost 89.4% of them recognized that they have to wear mask, boots, and cloth while spraying. Of 83.3% knew that pesticide can pass through their body by 3 routes; ingestion, dermal, and inhalation. 45.5% of respondents knew that spraying should be done in the windward direction and they have to use PPE. Many of respondents commonly check equipment before using and wear clothing thoroughly while spraying. Nevertheless, 77.2 % of chilli-growing farmers had low knowledge level, 54.5 % of the farmers' attitudes were not concerned about pesticide use and exposure and 85.0 % of farmers had fair practices level. The statistically significant association between knowledge and attitude, knowledge and practice, and attitude and practice were low positive correlation (Spearman's rank correlation coefficient 0.216, 0.285, and 0.305 respectively, *p-value* < 0.001). The study suggested that the government authorities and community should have the appropriate recommendations, strategies and guidelines to prevent adverse health effects regarding to pesticide exposure of farmers in this area.

Field of Study: Public Health Student's Signature: SAOWANEE NORKAEW

Academic Year: 2009 Advisor's Signature:

Co-Advisor's Signature:

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I would like to express my overwhelm gratitude and deep appreciation to my thesis advisor, Dr.Wattasit Siriwong, for his advices, suggestions and encouragement. With my respect and heartfelt appreciation, I would like to express my sincere thanks to Professor Mark Gregory Robson, my co-advisor, for his kindly support and his encouragement. I greatly express my thanks to Assoc. Prof. Somrat Lertmaharit, my thesis chairman, and Dr. Sumana Siripattanakul, my external examiner, for their comments and suggestions.

For chilli-growing farmers, I would like to give my sincere thanks to their kindness and their friendliness. My appreciation is offered to Mrs.Karnchana at Ubonratchathani university laboratory for her kindness and my colleagues at Ubonratchathani, Mr.Karnchit and Mr.Sakchai, for their help in the data collection step. Moreover, I would like to thanks to my uncle, Mr.Dussadee Sawangwong, for his assistance and his kindness. I also express my appreciation to Ms.Nutta Taneepanichskul for her great friendship and her assistance in everything.

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LIST OF ABBREVIATIONS

HCWs	Health Care Workers
HICPAC	Hospital Infection Control Practices Advisory Committee
IPM	Integrated Pest Management
KAP	Knowledge, Attitude and Practice
NIH	National Institutes of Health
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
UNEP	United Nations Environmental Program
UniSA	University of South Australia
US EPA	United States Environmental Protection Agency
WHO	World Health Organization
WPS	Worker Protection Standard

CHAPTER I

INTRODUCTION

1.1 Background and significance of the problem

Pesticides are widely used throughout the world, especially in agriculture for crop protection. Thailand is considered an agricultural country although its industrial sector is extending. Approximately 40% of the country's area is agriculture and 60% of the total national workforce is in agriculture (National Statistic Office of Thailand, 2008). In order to encourage agricultural production and capability, farmers have used large amounts of agrochemicals including fertilizers and pesticides. Thailand has increase in the amount of pesticides imported, considered from approximately 21,000 tons in 1994 to over 80,000 tons in 2004. The major proportion of imported pesticides in these lately years was herbicides, insecticides, fungicides, plant growth regulators and other groups of. In Asia, Thailand ranked fourth in annual pesticide consumption. The average pesticide use is very high and Thailand is the country with the third highest pesticide use rate, following Korea and Malaysia (Panuwat et al., 2008).

Even though pesticides increase crop protection but pesticides are harmful effects on human health. An important problem related to agriculture is pesticide poisoning. In 2008, illness from pesticide poisoning was highest among occupational diseases approximately, 79.63 % of total occupational diseases (Division of Epidemiology, 2008).

Health Systems Research Institute (2005) reported that Thai farmers are at risk regarding to pesticide poisoning because of inappropriate pesticide use, unsuitable use of personal protective equipment (PPE) (e.g., gloves, respirators) and deficient understanding of the pesticide toxicity. Normal misappropriation of pesticides use are include the use more than amounts or concentrations that recommend on the label, mixing various pesticides together, inappropriate use of PPE while mixing or applying pesticides, improper disposal of pesticides, and a lack of awareness and knowledge.

Ubonratchathani Province is located in the northeast region of Thailand. Based on the general information of Ubonratchathani Province, the topographic characteristic consists of plateau and plan alternations regions and many of the mountains in the southern of the area. The weather is moderately warm; the average temperature in the dry season (October to April) is 24.69 $\pm$ 0.35 degree in calculus. The rainy season is on May to September. Over a total area of 16,112 km^2, for 10,577.66 km^2 is used for crop cultivation and vegetation (Topography of Ubonratchathani Province, 2008). Because the province has large percentage of cultivated area, it has produced various agricultural products such as rice, cassava, chilli and rubber tree. Certainly, crop protection and cultivation agents have been intensely utilized especially pesticides. (Agricultural Extension Office of Ubonratchathani Province, 2008)

The objectives of this study was to assess the knowledge, attitude and practice on using personal protective equipment, to evaluate the knowledge, attitudes, and practices (KAP) associated with pesticide use and exposure in the chilli-growing farmers and to provide the recommendations and guidelines to reduce the farmers exposure to pesticides of chilli-growing farmers in Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand.

1.2 Research question of the study

1. What are knowledge, attitude and practice on using personal protective equipment among chilli-growing farmers in Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand?
2. Is there any association between knowledge and attitude, knowledge and practice and attitude and practice on usage of personal protective equipment (PPE)?

1.3 Purposes of the study

1. To assess the knowledge, attitude and practice on using personal protective equipment of chilli-growing farmers in Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand.
2. To evaluate the knowledge, attitudes, and practices (KAP) associated with pesticide use and exposure in the chilli-growing farmers.
3. To provide the recommendations and guidelines to reduce the farmers exposure to pesticides.

1.4 Benefits of the study

Understanding the knowledge, attitude and practice on using personal protective equipment and providing recommendations and guidelines for using personal protective equipment for chili growers to protect them from adverse health effect from pesticides

1.5 Study area

The study area is Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand.

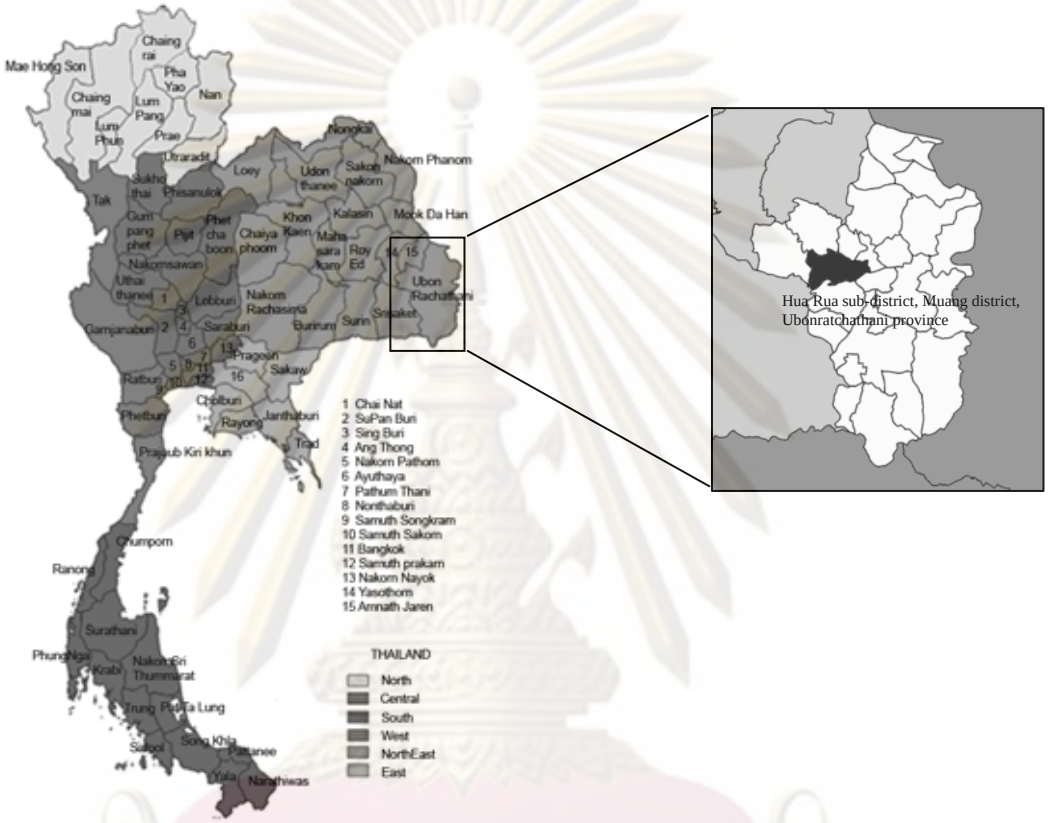

Figure1. The study area locates at Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand.

1.6 Variable in the study

1.6.1 Independent variables

Socio demographics

Including gender, age, family income, pesticide exposure of chilli-growing farmers

Knowledge

Knowledge of health effects of pesticide, type of personal protective equipment the chilli-growing farmers should use, and how to prevent themselves from adverse health effects of pesticide in their farm work

Attitude

Attitude is perceived susceptibility, severity and benefits of using personal protective equipment (PPE) for chilli-growing farmers

1.6.2 Dependent variables

Practice

Practice about preventing themselves from adverse health effects of pesticide exposure and correctly use of personal protective equipment (PPE) in their farm work

1.7 Conceptual framework

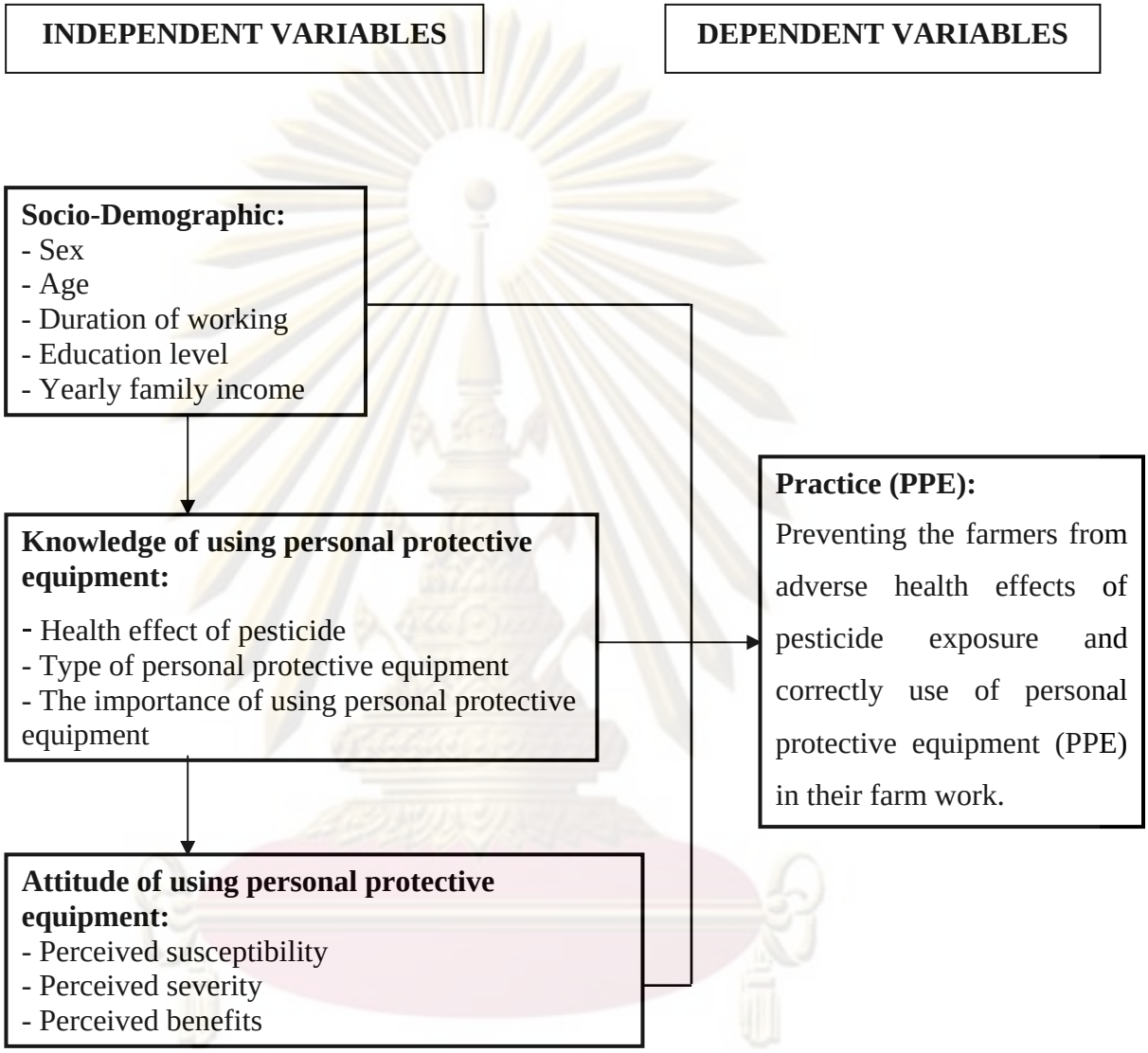

Figure2 Conceptual framework

1.8 Operational Definitions

The participant refers to the chilli-growing farmers who use pesticides to control pest in chilli farms and directly apply pesticides to their farm. The participant was selected by convenient sampling in this area; ≥ 18 years of age.

Included; men and women.

Excluded; children and pregnant women.

Personal Protective Equipment (PPE) refers to chilli-growing farmers use gloves, clothes, boots and face mask to protect them form pesticide exposure.

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CHAPTER II

LITERATURE REVIEW

2.1 Knowledge Attitude Practice (KAP)

KAP study

A KAP study measures the Knowledge, Attitude and Practice of a community. It serves as an educational tool for the community. The main purpose of this KAP study is to explore changes in Knowledge, Attitude and Practice of the community (Kaliyaperumal, 2004).

KAP survey

A KAP survey is a representative study of a specific population to collect information on what is known, believed and done in relation to a particular topic (WHO, 2008).

Most of the KAP survey data are collected orally by an interviewer using a structured, standardized questionnaire. These data can be analyzed quantitatively or qualitatively depend on the objectives and design of the study. KAP survey data are essential to help plan, implement and evaluate the particular topic. It gathers information about what respondents know, what they think and what they actually do with the particular topic. KAP survey can identify knowledge gaps, cultural beliefs or behavior patterns that may facilitate understanding and action. They can identify information that is common known and common attitude. Also can identify factors influencing behavior that are not known in most of people, reasons for their attitude and why and how people practice certain health behaviors.

A KAP will probably require internal and external with specialized skills. It may be necessary to hire individuals or agencies to lead tasks, design the questionnaires, conduct the interviews in the local languages and enter data into a computer and analyses data.

KAP steps:

KAP surveys have 6 steps (WHO, 2008) following;

Step1: Define the survey objective

Contain information about how to access exist information, determine the purpose of the survey and main area of enquiry and identify the survey population and sampling plan

Step 2: Develop the survey protocol

To include in the survey protocol and suggestions to help identify the key research questions. Determine whether the survey needs ethical review is critical in this step and create a work plan and budget.

Step 3: Design the survey questionnaire

Purposes important steps for develop, pre-testing and finalizing the questionnaires and for making a data analysis plan.

Step 4: Implement the KAP survey

Includes considerations for choose the survey data, recruiting and training survey supervisors and interviewers, and management survey implementation.

Step 5: Analyze the data

Consists of enter and check the quality of the survey data and implementing the data analysis plan created in Step 3.

Step 6: Use the data

How to translate the survey's found into action, elements to include in the study report and how to disseminate the survey find.

Steps in preparation of a KAP questionnaire (Kaliyaperumal, 2004)

1. Domain Identification

   The domain or subject will be conduced on, must be identified. The domain will have more specifically in the Knowledge, Attitude and Practices of the population with regard to the health effects.

2. Question preparation

   Questions should be prepared to test of the study, Knowledge, Attitude and Practices.

   Question included in the Knowledge section should be designed to test the knowledge of respondents. These should be open-ended questions, can result in guessing and therefore give a false impression of the knowledge of the population.

   Question included in the Attitude section should be designed to gauge the prevailing attitude, beliefs and misconceptions in the population. This could be most effectively done using a different strategy. Statement should be provided and respondents should be asked to indicate the extent to which they agree with those statements, on a pre-determined scale (strongly disagree, moderately disagree, neutral, moderately agree, strongly agree).

   Question included in the Practices section should be designed to assess the practices of the population with regard to the health effect. These should be open-ended questions like those asked in the Knowledge section, to prevent false information as a result of guessing.

3. Validation question

   Once the questions for the study are prepared they must be validated. This validation should be aimed at assessing their ease of comprehension, relevance to their intended topics, effectiveness in providing useful information and the degree to which the questions are interpreted and understood by different individuals.

Validation should be conduced by a pre-testing on a small group of representatives of the population. Once this small group has completed the questionnaire the results should be analyzed. This analysis should validate the degree to which the questions were property understood and misunderstood, the degree to which individual within a group interpreted the questions differently, the effectiveness of the questions in soliciting the proper information and any areas of information which were neglected by the proposed questionnaire.

Once analysis has been completed the questions should be modified if necessary to reflect the results of the pre-test. This will result in the final version of the KAP questionnaire.

Conducting a KAP study (Kaliyaperumal, 2004)

First step in conducting is the selection of the sample to which the survey will be given. The sample should be sufficiently large so. If the population's not so large that the data collection and analysis is difficult. Be careful in choosing the sample size, to take into account that some of those selected may be difficult or impossible to contact or unwilling to participate in the study.

Division of the population into smaller categories is typically desirable as differing groups in the community have different education, cultural and socioeconomic backgrounds and will have differing levels of KAP.

After collection, the data should be analyzed to determine the KAP level of the community. Questions in the Knowledge, which often have more than one component to a correct answer, must be analyzed differently from those in the Attitude section, which must in turn be analyzed differently from those in the Practice section.

2.2 General pesticide

Pesticides are often referred to according to the type of pest they control. Another way to think about pesticides is to consider those that are chemical pesticides or are derived from a common source or production method. Other categories include bio-pesticides, antimicrobials, and pest control devices. (US EPA, 2006)

Type of pesticide (US EPA, 2006)

2.2.1 Organophosphate Pesticides These pesticides affect the nervous system by disrupting the enzyme that regulates acetylcholine, a neurotransmitter. Most organophosphates are insecticides. They were developed during the early 19th century, but their effects on insects, which are similar to their effects on humans, were discovered in 1932. Some are very poisonous (they were used in World War II as nerve agents). However, they usually are not persistent in the environment.

2.2.2 Carbamate Pesticides affect the nervous system by disrupting an enzyme that regulates acetylcholine, a neurotransmitter. The enzyme effects are usually reversible. There are several subgroups within the carbamates.

2.2.3 Pyrethroid Pesticides were developed as a synthetic version of the naturally occurring pesticide pyrethrin, which is found in chrysanthemums. They have been modified to increase their stability in the environment. Some synthetic pyrethroids are toxic to the nervous system.

2.3 Health effects

Pesticides can be dangerous to consumers, workers and close bystanders during manufacture, transport, or during and after use. The American Medical Association (Ref) recommends limiting exposure to pesticides and using safer alternatives.

Particular uncertainty exists regarding the long-term effects of low-dose pesticide exposures. Current surveillance systems are inadequate to characterize potential exposure problems related either to pesticide usage or pesticide-related illnesses.

Farmers and workers

The World Health Organization and the UN Environment Program estimate that each year, 3 million workers in agriculture in the developing world experience severe poisoning from pesticides, about 18,000 of whom die. According to one study, as many as 25 million workers in developing countries may suffer mild pesticide poisoning yearly. There have been many studies of farmers intended to determine health effects of occupational pesticide exposure. Associations between non-Hodgkin lymphoma, leukemia, prostate cancer and soft tissues sarcoma have been reported in studies, with less association found for other cancers. (Ref)

Organophosphate pesticides have increased in use, because they are less damaging to the environment and they are less persistent than organochlorine pesticides. These are associated with acute health problems for workers that handle the chemicals, such as abdominal pain, dizziness, headaches, nausea, vomiting, as well as skin and eye problems. Additionally, many studies have indicated that pesticide exposure is associated with long-term health problems such as respiratory problems, memory disorders, dermatologic conditions, cancer, depression, neurological deficits, miscarriages, and birth defects. Summaries of peer-reviewed research have examined the link between pesticide exposure and neurological outcomes and cancer, perhaps the two most significant things resulting in organophosphate-exposed workers.

According to researchers from the National Institutes of Health (NIH), licensed pesticide applicators that used chlorinated pesticides on more than 100 days in their lifetime were at greater risk of diabetes. One study found that associations between specific pesticides and incident diabetes ranged from a 20 percent to a 200 percent increase in risk.

2.4 Personal Protective Equipment (PPE)

PPE requirements are specified for uses covered under the Worker Protection Standard (WPS), but there are no regulatory requirements for non-WPS products, products used by residents, or products intended only for manufacturing use. However, to protect human health, the following guidance is offered. (US EPA, 2007)

PPE definition

Personal Protective Equipment (PPE) is safety clothing and equipment for specified circumstances or areas, where the nature of the work involved or the conditions under which people are working, requires its wearing or use for their personal protective to minimize risk (UniSA, 2008).

All end-use occupational use products must have the minimum baseline handler PPE of long-sleeved shirt, long pants and socks and shoes (OSHA, 2003).

PPE required for early entry to treated areas (that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water), are: (US EPA, 2009)

- Coveralls over long-sleeved shirt and long pants
- Chemical-resistant gloves
- Chemical-resistant footwear plus socks
- Protective eyewear
- Chemical-resistant headgear

Handler Personal Protective Equipment (PPE)

The correct handler PPE is determined by comparing the product-specific handler PPE specified in the acute toxicity review for a product with the chemical-specific handler PPE requirements specified in the regulatory assessment document. In most cases, the reviewer uses a combination of the most protective statements given in the regulatory assessment document and the Acute Toxicity Review to determine the correct handler PPE labeling. The correct product specific handler PPE can be derived from the Acute Toxicity Review for a given product or refer to sections 1 through 4 below to determine the correct product-specific PPE. Once the correct product-specific handler PPE has been determined, the reviewer should compare this labeling with worker protection labeling required by the regulatory assessment document and use the table in this section to select the most protective PPE.

Identifying the Correct Product-Specific Handler Protective Clothing. Once the correct toxicity category has been established, the product-specific handler PPE can be identified. Reviewers may obtain the correct product-specific handler protective clothing from the Acute Toxicity Review. Table 1 below shows how the correct product-specific handler protective clothing is derived in the Acute Toxicity Review based on the toxicity category for a given product.

Table 1: Handler PPE for Worker Protection Standard (WPS) products (EPA, 2007)

Route of Exposure	Toxicity Category by Route of Exposure of End-Use Product			
	I DANGER	II WARNING	III CAUTION	IV CAUTION
Dermal Toxicity or Skin Irritation Potential1	Coveralls worn over long-sleeved shirt and long pants Socks Chemical-resistant footwear Chemical-resistant Gloves	Coveralls worn over short-sleeved shirt and short pants Socks Chemical-resistant footwear Chemical-resistant Gloves	Long-sleeved shirt and long pants Socks Shoes Chemical-resistant Gloves	Long-sleeved shirt and long pants Socks Shoes No minimum
Inhalation Toxicity	Respiratory protection device	Respiratory protection device	No minimum	No minimum
Eye Irritation Potential	Protective eyewear	Protective eyewear	No minimum	No minimum

Listed of the default glove types required by the WPS:

1. Solid Formulations: For those products which are applied as solids or formulated as solids and diluted solely with water for application, the glove statement shall specify: “waterproof gloves.”

2. Aqueous-Based Formulations: For those products which are applied as formulated or diluted solely with water for application, the glove statement may specify: “waterproof gloves” instead of “chemical-resistant” gloves.

3. Other Liquid Formulations: For those products which are applied as formulated or diluted with liquids other than water: (constitutes more than 5% of the end-use product), the glove statement shall specify "chemical-resistant (such as nitrile or butyl) gloves."

4. Gaseous Formulations or Formulations applied as Gases: For products that are applied or formulated as gases, any existing glove statement established before 10/20/1992 including any glove prohibition statement will continue to apply. If no glove statement or glove prohibition currently exists on the label, then the glove statement shall be "chemical-resistant (such as nitrile or butyl) gloves

Table 2: Guide to selecting the most protective handler PPE level of protection (Ref)

Type of PPE	Minimum Required	Next Highest Level of Protection	Next Highest Level of Protection	Highest Level of Protection
Protective Clothing	Long-sleeved shirt and long pants	Coveralls over short-sleeved shirt and short pants	Coveralls over long-sleeved shirt and long pants	Chemical Resistant Suit
Protective Footwear	Socks and Shoes	Chemical -resistant footwear	Chemical-resistant boots	NA
Gloves	None	Chemical-resistant gloves	NA	NA
Protective Headwear	None	Chemical-resistant headgear	NA	NA
Chemical resistant Apron	None	Chemical-resistant apron worn over long-sleeved shirt and long pants	Chemical-resistant apron worn over coveralls over long-sleeved shirt and long pants	NA
Respiratory Protection Device	None	Filtering face piece respirator (N95, R95,or P95)[1]	Elastomeric Half Mask respirator with appropriate cartridges and/or filters[2]	Air Supplying Respirator

[1] Can be used only for dusts/mists where a protection factor of 5 is needed.

[2] Can be used for dusts/mists and/or vapors/gases with appropriate cartridges and/or filter.

2.5 Previous studies

There have been many studies on KAP in regards to PPE. For example; In 2007, a study on Knowledge, Attitude and Practice regarding pesticides exposure in Culturama, Brazil by Recena et al. The objectives of this study were to evaluate the knowledge, attitudes and practices associated with pesticide use and exposure in an agricultural community of Culturama, Brazil. One person was selected from each farm to make up a sample of 250 participants in the Culturama, Brazil (age ≥18 years old). The average age was 43.6 years and 58.4% were between 31 and 50 years old. Most of the participants had less than 8 years of education (83.2%) and 17.6% had never been to school. 92% of farmers used pesticide and 50% of farmers have worked with pesticide for over 20 years. 44.3% of participants were aware that pesticide are toxic. They found a significant correlation between hand washing after pesticide application and reporting symptoms. Most of the farmers used organophosphorus insecticide, methamidophos, a great majority considered pesticide to be harmful to human health. Less than 20% of farmers used masks, impermeable clothes or gloves during pesticide application. The grower, who used high toxic insecticides, used low-technology equipment and not uses personal protective equipment (PPE). Thus, much of the population may have a high risk of pesticide exposure. The farmers recognized the potential harm of pesticides to human health and the environment, transforming this knowledge into practical behavior. Governmental actions, restrictions or prohibition of the use of more toxic pesticides and enforcement of good agricultural practices including the use of safety equipment are needed to decrease pesticide exposure in farmers.

Atreya (2007) conducted a study on knowledge, attitude, and practice of pesticide use related to gender in Nepal. This study aimed to understand gender differences of pesticide use to identify the level of health risk by gender and to recommend more gender-sensitive awareness and training program. This was used at the national, regional and district level to implement The National Integrated Pest Management (IPM) program. They sought to find whether there is there a significant difference of knowledge and practice of pesticide use between males and females. In the study, farmers switched from rice-maize based cropping systems to vegetable-

based cropping systems with a high use of pesticides. Population of the study area is stratified into 18 units and household were sampled from these villages. Samples of 292 households were randomly and proportionately selected from these villages. They interviewed a total 434 individuals (325 of males and 109 of females). The survey was based on pesticide knowledge, attitude and practice. The questionnaire was developed from literature review and prior questionnaires from the World Bank. This study found that more than 50% of females had never been to school and only 8% of individuals were trained in Integrated Pest Management (IPM). Almost all males and females did not smoke, drink or eat during pesticides application and believed that pesticides are harmful to human health, livestock, plant diversity, and the surrounding environment. This study found that the age of male applicators was normally distributed whereas females' age was found to be skewed. Females were higher risk due to lower level of pesticide use safety and awareness.

In 2005, a studied on knowledge, attitude and practice regarding organic solvents among printing workers in Hong Kong. Carried out by Ignatius, Nga, and Wang (Ignatius et al., 2005). The study aimed to find out the prevalence of good knowledge, appropriate attitude and safe practices among printing workers exposed to organic solvents. The survey was conducted in a sample of 501 male printing workers from 28 factories in Hong Kong. This study found that adequate knowledge, appropriate attitude, and safe practice were low at 20.4%, 38.4% and 22.0%, respectively. They found that good knowledge of printing workers was positively associated with awareness of the relevant legislation and past drinking behavior and negatively associated with current smoking status. The appropriate attitude depended on having good knowledge of the harmful effects of organic solvents; however, safe practices did not depend on knowledge and attitude, but instead with increased information of necessary safety precautions by supervisors. This study confirmed the important role of front line supervisors in improving safe practices of workers by informing them of the necessary precautions and supplying relevant information on chemical hazard.

A KAP survey was conducted in Gaza strip by Yassin, Abu Mourad and Safi in 2002 (Yassin et al., 2002). This study aimed to assess knowledge, attitude, practice, and toxicity symptoms associated with pesticide use and exposure among 189 farm workers in the Gaza strip. They performed a cross section of agricultural farm workers in the Gaza strip and used a questionnaire to assess their knowledge, attitude and practice towards pesticide use, and associated toxicity symptoms. This study found that farm workers had high levels of knowledge on the health impact of pesticides. Most of the farm workers were aware of the protective measures that should be used during applying pesticide; however, no one took precautions unless they knew about the measures. They found the prevalence of toxicity symptoms was dependent on mixing and use of high concentrations of pesticides. This study found the highest percentage of toxicity symptoms among the farm workers who returned to sprayed fields with in on hour of applying pesticides. Finally, they found the farm workers in the Gaza strip used pesticide extensively. Despite their knowledge about the adverse health impact of the pesticides, the use of protective measure was poor.

Mehrdad et al., (2005) conducted a study on assessment of knowledge, attitude and practices regarding isolation precautions among Iranian healthcare workers. This study aimed to determine the level of knowledge, attitude and self-reported practices involving isolation precautions among medical, dental and nursing staff in university-affiliated hospitals in Iran. They used a semi-structured interview questionnaire based on the Hospital Infection Control Practices Advisory Committee (HICPAC) guideline for isolation precautions in hospitals was developed by content experts, included demo-graphic variables and questions about knowledge, attitude and practices associated with 5 hand washing, 11 protective equipment, 10 isolation precautions and 2 miscellaneous items. They conducted a survey of 1,048 healthcare workers (HCWs) at 8 Iranian hospitals regarding knowledge, attitudes and practices related to isolation precautions. They found 75% below acceptable safety levels, routine hand washing before and after glove use were reported by fewer than half of the HCWs.

In Thailand, Sematong et al., (2008) conducted a study on pesticide use, farmer knowledge and awareness in Thong Pha Phom region, Kanchanaburi province. This study aimed to gather information on type and quantity of pesticide commonly used in the area and to assess knowledge and behavior of the farmers in Thong Pha Phom region, Kanchanaburi province. They used a questionnaire with close and open-questions. The question was developed to collect data about socio-economic background of farmers, knowledge, awareness and behavior of farmers related to pesticide use. They found 84% of farmers used pesticide in their agricultural activities. The most commonly used herbicides were glyphosate and paraguatdichloride and the most commonly used insecticides were methomyl, chlorpyrifos and parathion methyl. The heaviest use of herbicide occurred in May or beginning of the rainy season when farmers prepared their fields for new crop, and the heaviest use of insecticide occurred in April in order to control the outbreak of aphids. On knowledge and behavior related to the safe use of pesticides, they found the farmers had sufficient knowledge on general practice for the safe use of pesticide. But knowledge on how to read the safety symbols on pesticide label, standard first-aids protocol and the awareness on potential exposure during pesticide spraying was still poorly perceived by the farmers.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research design

A cross sectional study (concerning Knowledge, Attitude, and Practice (KAP) of Using Personal Protective Equipment (PPE) for Chilli-Growing Farmers in Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand)

3.2 Study population

The study population of this study was mainly chilli-growing farmers in Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand. This research concentrated on farmers who use pesticides to control pest in chilli farms. From observation in the area, it found farmers use a lot of pesticides and they apply over the recommendation dose. However, chilli-growing farmers always don't protect themselves from pesticide by using personal protective equipment. They are mixing pesticide nearby their farms or house. Some of farmers are lack of knowledge of using pesticide and lack of attitude regarding how to protect them. Thus, this research was measure the concentration of knowledge, attitude and practice of using personal protective equipment.

3.3 Sample size calculation

Chilli-growing farmers were selected by convenient sampling in this area; the number of farmers in this area 1200 farmers. However, they have to be persons who directly apply pesticides to their farm. Most of them are the owner of farm and they have controlled and mixed volume of pesticide by themselves. This study calculates sample size from sample size for finite population (Lemeshow et al., 1990).

$$n = \frac{NZ^2p(1-p)}{d^2(N-1) + Z^2p(1-p)}$$

Where:

n: Sample size

N: Population size (chilli farmers in this area)

Z: Reliability of coefficient base on level of significance (Z=1.96)

p: Proportion of growers have knowledge about using PPE (p=0.5)

d: Absolute precision required (d=0.05)

Therefore:
$$n = \frac{1{,}200\ (1.96)^2(0.5)\ (0.5)}{(0.05)^2(1{,}200-1) + ((1.96)^2(0.5)\ (0.5))}$$

$$= 292$$

With estimate 10% will not participate

The sample size is 322 growers

3.4 Sampling method

In Thailand, the one of biggest chilli-growing area is Huarua Sub-District, Mueang District, Ubonrachathani Province. Thus, this area was selected to be a study area. Most of chilli products in this area are supported consumers in Thailand and exported as a chilli product of this country.

Chilli-growing farmers were selected by convenient sampling and the subjects were farmers who use pesticides in their farm. Most of them were the farm owner; they were mixing and spraying pesticide by themselves. Thus, this research focused on chilli-growing farmers who use pesticide to their field directly. The farmer's age was more than 18 years old, included men and women and excluded children and pregnant women.

3.5 Research instruments and measurement

The data collection instrument in this research was using standardized questionnaire by face to face interview at their house and/or farm. In this step, the researcher and research assistances had coordinated with leader of community before interviewing chilli-growing farmers. The research assistances were well trained. They can speak local language and familiar with the farmers in order to avoid communication bias.

In this study, the questionnaire was employed to assess the knowledge, attitude and practice on using personal protective equipment of chilli-growing farmers. The questionnaire was modified from a questionnaire previously used with tangerine farmers in the pesticide safe use project (Sinhaseni et al., 1994; Jaipieam, 2008). The pretest of the questionnaire was tested with 30 participants in another chilli farming community. The questionnaire consists of five parts.

Part 1: Socio demographics

There were 16 questions in this part. The questions included general information such as gender, age, education levels and monthly family income, duration of working, and frequency working.

Part 2: Information regarding pesticide use

There were 8 questions in this part asking about pesticide use.

Part 3: Knowledge regarding use of PPE to pretect themselves from pesticide exposure.

There were 15 questions in this part. The questions asked for the knowledge of using pesticide and personal protective equipment (PPE) including adverse health effect of pesticides and types of proper PPE.

A correct answer was given 1 score and 0 score for wrong answer. The scores were varied from 0-15 points and classified into 3 levels as follow: Bloom’s cut off point, 60%-80%

Table 3: Levels of knowledge

Scores	Descriptions
0-9 (Less than 60%)	Low levels
10-12 (60-81%)	Moderate levels
13-15 (80-100%)	High levels

Part 4: Attitude regarding using PPE to prevent themselves from pesticide

There were 15 questions in this part. This part includes the attitude of the people towards using pesticide and personal protective equipment. It was assessed by using Likert's scale. There were 10 statements witch include both positive and negative. The rating scale was measure as follow:

Table 4: Statement of Likert's scale

Positive Statement		Negative Statement	
Choice	Scores	Choice	Scores
Strongly agree	4	Strongly agree	0
Agree	3	Agree	1
Neural	2	Neural	2
Disagree	1	Disagree	3
Strongly disagree	0	Strongly disagree	4

The scores varied from 0 to 60 and all individual answers were summed up for total scores and calculate for means. The scores were classified into 3 levels i.e.

Concern Attitude	48-60 scores (81%-100%)
Neutral Attitude	36-47 scores (60%-80%)
Not concern Attitude	00-35 scores (Less than 60%)

Part 5: Practice of using PPE to prevent them from pesticide

There were 23 questions in general practice of the chilli-growing farmers work on using pesticide regarding using personal protective equipment. This part asked about how often they use personal protective equipment. There were 8 statements witch include both positive and negative. The rating scale is measure as follow:

Table 5: Statement of Practice's score

Positive Statement		Negative Statement	
Choice	Scores	Choice	Scores
Usually	4	Usually	1
Sometime	3	Sometime	2
Rarely	2	Rarely	3
Never	1	Never	4

The scores varied from 23 to 92 and were classified into 3 levels (Good Practice, Fair Practice and Poor Practice).

Good Practice 74-92 scores (81%-100%)

Fair Practice 55-73 scores (60%-80%)

Poor Practice 23-54 scores (Less than 60%)

3.6 Data collection

The Questionnaire included (Appendix X);

- Socio demographics
- Information regarding pesticide use
- Knowledge regarding using PPE to prevent themselves from pesticide
- Attitude regarding using PPE to prevent themselves from pesticide
- Practice of using PPE to prevent them from pesticide

3.7 Data analysis

Statistical technique

The licensed SPSS software for windows version 17 was used for quantitative data analysis

Descriptive statistics such as frequency, percentage, mean and standard deviation were used primarily to summarize and describe the data to make it more graspable.

Inferential statistics Spearman's Rank Correlation Coefficient was used to describe the strength and direction of the relationship between knowledge and attitude, knowledge and practice, and attitude and practice.

Interpretation was done as follow table x (Hinkle et al, 2003);

Table 6: Interpretation the correlation

Absolute Value of r	Interpretation
0.90 to 1.00	Very high correlation
0.70 to 0.90	High correlation
0.50 to 0.70	Moderate correlation
0.30 to 0.50	Low correlation
0.00 to 0.30	Little if any correlation

3.8 Ethical considerations

This study was approved by The Ethic Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University. With the certified code No. 010/2553, all participants signed a consent form prior to participation in this study.

CHAPTER IV

RESEARCH RESULTS

This chapter provides a detailed description of the results obtained from the analysis of the survey. The variables are described as simple percentage, means and standard deviations as appropriateness. It starts with the socio-demographics data followed by the responses for each part of the questionnaire. The level of knowledge, attitude and practice score were then presented and followed by the results of statistic test used as appropriated. Lastly, the relationship between knowledge and attitude and practice scores among the respondents was described by correlation.

4.1 Socio-Demographics Information

This study was conducted in Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand. The participants were consented to complete the face to face questionnaires. The questions were administered by a researcher and research assistance.

The total response for questionnaire interview was 330 participants. Table 7 showed the age ranged from 24 to 70 years. The average age of the participants was 42 years with a standard deviation of 10.7. The majority of the respondents were in the range of 31-40 (39.6%) and 41-50 years (31.9%), while 12% were in range of 51-60 years and 6% were older than 60 years.

The majority of the participants were male (53.00%), couple (87.9 %), and head of family (51.5%). Result of education status showed that 71.2% had graduated from primary school. 57.6% of the the respondents had an income less than 50,000 baht. For property of land for chilli farms, approximately 75.8 % of respondents have less than 3 rais (1 rai = 1600 square metres). 84.8% of the respondents were farm owner.

Table 7**:** Social and demographic characteristics of the chilli-growing farmers who participated in the study

Characteristics	**Number (n=330)**	**Percentage (%)**
Age (years)		
≤ 30	35	10.5
31-40	130	39.6
41-50	105	31.9
51-60	40	12.0
>60	20	6.0
Mean ± SD = 42.0 ± 10.7 Range= 24 to 70		
Gender		
Male	175	53
Female	155	47
Marital status		
Single	35	10.6
Couple	290	87.9
Widow	5	1.5
Status in family		
Head of family	170	51.5
Spouse	110	33.3
Child	25	7.6
Parent	5	1.5
Occupant	20	6.1
Education		
Never	10	3.0
Primary school	235	71.2
Secondary school	50	15.2
High school	30	9.1
Bachelor’s degree	5	1.5

Characteristics	Number (n=330)	Percentage (%)
Income (Baht/year)	190	57.6
< 50,000	95	28.8
50,001-150,000	40	12.1
150,001-300,000	5	1.5
>300,001		
land owner (1 rai = 1,600 sqm^2)		
< 3 rais	215	65.2
3-5 rais	100	30.3
5-7 rais	15	4.5
Property relationship		
Owner	280	84.8
Renter/Employee	50	15.2

4.2 Information regarding pesticides use

Table 8 illustrates the experienced problems of the respondents when they were growing were insect 84.8%, weed 60.6%, and plant disease 74.2%. Most growers did not have problem with animals. The farmers commonly applied abamectin 47%, selecron (profenofos) 23.3% and podium600 (chlorpyrifos) 14.9% during their crop. The pesticide applications were by self-spraying 81.8% and hired other applicators to spray 18.2%.

In addition 77.3% of the respondents did not have habitual disease. Symptoms associated with pesticide use that we found form interview were never had any symptoms 57.6%, few symptoms (headache, fatigue, dizziness, stomach cramps and throat irritation) 39.4%, moderate symptoms (nausea, vomit, blurs vision, shivering, constriction, cramp and hyperventilation) 3%. All of respondents did not report on nervous symptom (contracted pupils of the eye, excessive sweating, and salivation. 48.5% of respondents had a cholinesterase test in the last 12 months were normal while 34.8% had never check cholinesterase level within 12 months.

When the farmers got the health effect from pesticides, they went to health center 23.33%, by themselves 23.33%, herbal use by themselves 18.79%, and provincial hospital 11.21%. However, approximately 20% of respondents went to district hospital and alternative medicine.

The sources of information which the respondents obtain pesticide knowledge information were from agricultural officer 17.89%, television 15.75% respectively. Other sources were pesticide salesman 14.56%, documents 12.72% and radio 12.42%. Few of sources were from neighbor, broadcast tower, health volunteer and community leader approximate.

Table 8: Information of problem of weed, insect, pesticide use of the chilli-growing farmers who participated in the study

Characteristics	Number (n=330)	Percentage (%)
Insect problem		
Yes	280	84.8
No	50	15.2
Weed problem		
Yes	200	60.6
No	130	39.4
Plant disease problem		
Yes	245	74.2
No	85	25.8
Animal problem		
Yes	15	4.5
No	315	95.5
Common pesticide used		
Abamectin (abamectin)	155	47.0
Selecron (profenofos)	77	23.3
Podium 600 (chlorpyrifos)	49	14.9
Paraquat (paraquat)	30	9.1
Lanate (carbamate)	10	3.0
Other	9	2.7
Pesticide Application*		
Apply by self	270	81.8
Apply by hired applicator	60	18.2
Congenital disease		
Congenital disease	75	22.7
Never	255	77.3

Characteristics	Number (n=330)	Percentage (%)
Toxicity symptom		
Never	190	57.6
Few symptom	130	39.4
Moderate symptom	10	3.0
How to treat Toxicity symptom associated with pesticide*		
By themselves	77	23.33
Herbal use by themselves	62	18.79
Alternative medicine	27	8.18
Health center	77	23.33
Private clinic	18	5.46
District hospital	32	9.70
Provincial hospital	37	11.21
Source of pesticide information*		
Radio	41	12.42
TV	52	15.75
Document/article	42	12.72
Broadcast tower	28	8.48
Neighbor	33	10.00
Agricultural office	59	17.89
Public health office	7	2.12
Pesticide salesman	48	14.56
Community header	7	2.12
Health volunteer	13	3.94
Have you had a cholinesterase test in the last 12 months?		
Never	115	34.8
Yes but not know result	20	6.1
Yes and normal	160	48.5
Yes and not normal	30	9.1
Yes with health effects	5	1.5

*multiple choices

4.3 Knowledge of chilli-growing farmers regarding using PPE to prevent themselves from pesticides

Table 9 illustrates the knowledge of the participants answered a total of 15 questions. Each correct answer was given one point with a total of 15 points. The average knowledge score from the respondents was 6.48 (SD=2.64). The knowledge score was in the range from 2 to11. Approximately 70% of respondents got the score in the range from 2 to 9.

The questionnaire showed in appendix x. The highest item of the correct answer was the question no.9 “When you were spraying pesticide, what is the properly practice?” in which 89.4% respondents recognized that they have to use mask, wear boots and wear clothing thoroughly. Many respondents (83.3%) knew that the pesticides can pass through their body via 3 routes; ingestion, dermal and inhalation. About 71% of respondents knew that the pesticides were contaminated and accumulated in soil, water, air and vegetables were sprayed and they knew long term pesticides exposure symptoms were feel dizzy and feel dry (60.6%). More than half of them (57.6%) were used pesticides following the recommendation dose on label, they usually cleaned sprayer equipments with detergent, shower and immediately change their cloths after pesticide spraying. 47% of respondents concerned about manufacture and expire date and they selected pesticides in which it is appropriated with pests and they mixed an amount of pesticides depending on their need. Approximately, 26% of them knew the pesticides are harmful to all living things and also knew that they drink pesticides by accident, they make themselves vomit. About 20% of them knew about toxicity and harm of pesticides from colors on pesticide label and they separately kept pesticide products in cabinet and locked it. Less than 20% mixed all of pesticides in container before filled in sprayer machine. They disposed empty pesticide containers by thrown to local waste bins. Additionally, the lowest score of correct answer was question no.3 “How to use pesticide correctly” which the respondents only 9.1% selected the pesticides depend on pest.

Table 9: Number and percentage of knowledge for using PPE to prevent the respondents from pesticide

Knowledge items	**Correct**	
	Number (n=330)	**Percentage (%)**
1. How many routes that the pesticides can pass through the body? What?	275	83.3
2. What is disadvantage of pesticide use?	85	25.8
3. How to use the pesticide properly?	30	9.1
4. When you want to buy pesticide, How do you consider?	155	47
5. How to known toxicity of pesticide?	70	21.2
6. What is the correct method of pesticide use?	190	57.6
7. How to proper mix of pesticides?	60	18.2
8. After spraying, Where is the pesticide residual?	235	71.2
9. When you were spraying pesticide, What is the properly practice?	295	89.4
10. What are the properly practices after pesticide used?	190	57.6
11. How to storage the pesticide product?	75	22.7
12. How to dispose of empty pesticide containers?	50	15.2
13. What is the symptom of long term pesticide exposure?	200	60.6

Knowledge items	Correct	
	Number (n=330)	Percentage (%)
14. How to practice the first aid treatment, in case of acute exposed pesticide?	190	57.6
15. How to practices the first aid treatment, in case of drink pesticide?	85	25.8

The distribution of the knowledge of the respondents showed that 77.2% of respondents had “Low knowledge”, 22.8% of them had “Moderate knowledge” while there is on chilli-growing farmers had “High knowledge” as shown in table 10.

Table 10: Distribution of knowledge levels on using PPE

Knowledge level	Number (n=330)	Percentage (%)
Low level (≤60%)	255	77.2
Moderate level (60%-80%)	75	22.8
High level (81%-100%)	0	0

4.4 Attitudes of chilli-growing farmers regarding using PPE to prevent themselves from pesticides

According to table 11, 48.5% of respondents were not assured about coconut juice can help to excrete pesticide toxicity. Approximately 38% of them considered that pesticide harmful to the human health and environment and considered with exercise can help to excreting pesticide toxicity through sweat. 34.8% of them were not confident about drink water after exposed of pesticide for excreting pesticide toxicity. About 26% of respondents stated to using wood stick for pesticides mixing are safer than using hand. For negative statements, 45.5% of respondents believed that spraying should be done in the windward direction and they have to use PPE, 40.9% of respondents considered that use of pesticides over the recommendation dose may increase crop yield, 36.4% of them considered to mix various pesticides that may increase effectiveness of pest and 34.8% of them were not assured about pesticide residues in farm products and its harm to consumer. Approximately 33% of respondents were disagreed that pesticide can pass through the body only ingestion, they did not assure that not wear clothing thoroughly when spraying pesticides and considered with expensive chemicals are effective to control pest better than cheap chemicals. 30.3% of them agree that pesticide is harmful to insect only; it is not harmful to human health. Less than 30% of the respondents were stated with the idea that increase amount of pesticide anytime of use and they considered with after spraying chemical without wearing protective equipment must take a shower immediately as a preventive alternative.

Table 11: Percentages of attitudes towards using PPE of each individual item by respondents

Attitude items	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	%	%	%	%	%
1. Pesticide can pass through the body only ingestion route *	9.1	22.7	16.7	33.3	18.2
2. Pesticide harmful to insect only, not harmful to human health*	7.6	12.1	24.2	30.3	25.8
3. Increase amount of pesticide anytime of use to prevent resistance *	27.3	36.4	7.6	19.7	9.1
4. Mix various pesticides will increase effectiveness and no disadvantage *	21.2	36.4	16.7	16.7	9.1
5. Using wood-based to mix the pesticides is safety than using hand	18.2	22.7	13.6	19.7	25.8
6. Use pesticides more than label recommendation may increase yield*	12.1	40.9	22.7	15.2	9.1
7. If you stand windward direction when spraying pesticide, don't concern about clothes*	3.0	13.6	9.1	28.8	45.5
8. Pesticides are harmful to the human health and environment	16.7	37.9	22.7	12.1	10.6
9. Drink coconut juice after exposed pesticide for excreting pesticide toxicity*	3.0	19.7	48.5	9.1	19.7
10. Drink water after exposed pesticide for excreting pesticide toxicity*	15.2	28.8	34.8	15.2	6.1

Attitude items	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	%	%	%	%	%
11. Exercise can help to excreting pesticide toxicity through sweat	10.6	37.9	37.9	9.1	4.5
12. While you are spraying pesticide, you should not wear clothing thoroughly *	4.5	16.7	33.3	15.2	30.3
13. Pesticide can residues in agricultural product and its harm to consumer	15.2	25.8	34.8	19.7	4.5
14. Expensive chemicals are effective to control pest better than cheap chemicals*	21.2	33.3	13.6	27.3	4.5
15. If spraying chemical without wearing protective equipment, must shower immediately after the spray as a preventive alternative*	13.6	25.8	18.2	22.7	19.7

*negative statement

Table 12 illustrates chilli-growing farmers answered a total of 15 questions with the total score of 60 points. The distributions of attitudes of respondents were shown in table 6, there were 54.5% had “Not concern attitude”, 45.5% of them had “Neutral attitude”, while there is no chilli-growing farmers had “Concern attitude”. The average attitude score for all respondents were 35.07 out of a possible 60 points.

Table 12: Distribution of attitude levels towards using PPE of the respondents

Attitude level	**Number (n=330)**	**Percentage (%)**
Concern Attitude (81%-100%)	0	0
Neutral Attitude (60%-80%)	150	45.5
Not concern Attitude (Less than 60%)	180	54.5

4.5 Practices of chilli-growing farmers regarding using PPE to prevent them from pesticides

Table 13 illustrates the respondents took shower immediately after spraying 75.8%. 74.2% of them washed their hand and face with soup after using pesticide before having meal. Generally, they had checked equipment and material before using 68.2%. 63.6% of respondents wore cloth thoroughly while spraying and 62.1% prohibited human and animal out off their farm while spraying. Less than 60% of them wore boot, remove cloths which was wearing when spraying immediately, read label before use and follow recommendation all steps, wear gloves and mask when mixing pesticides and burned or buried the empty pesticide containers. Less than half of respondents learn about appropriate type of pesticide and washing cloths while wearing spray immediately. Moreover, they concerned to stand windward direction while spraying, with out protective equipment. About 30% of them were cleaning pesticide container with detergent but they did not keep pesticides in cabinets. In negative statement, 59.1% of respondents never mixed pesticides by bare hand and 53% of respondents had never been smoking or drinking water while spraying pesticides. Half of respondents were not spraying pesticides at windy time. Less than 50% of them did not throw pesticide containers into river or reservoir after used. Approximately 40% of respondents mixed many pesticides in order to increase an effective of weed and pest eradication. They selected pesticides by neighbors recommended, advertising, and price.

Table 13: Percentages of practice towards using PPE of the respondents

Practice items	usually (%)	sometime (%)	rarely (%)	never (%)
Before spraying				
1. Learn about appropriate type of pesticide	48.5	31.8	19.7	0
2. Select pesticide by neighbor's recommended/ advertising/ price *	24.2	39.4	36.4	0
3. Read label before use and follow recommendation all steps	57.6	28.8	12.1	1.5
4. Check equipment and material before using	68.2	24.2	6.1	1.5
5. Avoided human and animal from spraying area	62.1	13.6	13.6	10.6
6. Wear gloves and mask when mixing pesticides	56.1	12.1	21.2	10.6
7. Inhale pesticide for confirming real or fake pesticide*	6.1	6.1	42.4	45.5
8. Mix pesticide by hand*	9.1	6.1	25.8	59.1
9. Mix various pesticide for increase effective eradication of weed and pest*	21.2	40.9	31.8	6.1
Spraying				
10. Wear clothing thoroughly while spraying	63.6	25.8	10.6	0
11. Wear boot while spraying	59.1	28.8	12.1	0
12. Smoking or drinking while spraying*	4.8	9.1	33.3	53.0

Practice items	usually (%)	sometime (%)	rarely (%)	never (%)
13. Spray pesticide while windy*	1.5	19.7	28.8	50.0
14. Stand windward direction while spraying, with out protective equipment*	18.2	19.7	36.4	25.8
After spraying				
15. Cleaning pesticide containers in the river after used*	3.0	19.7	34.8	42.5
16. Dispose pesticide containers in the river after used*	1.5	27.3	24.2	47
17. Cleaning pesticide applicators with detergent before storage	25.8	30.3	18.2	25.8
18. Remove cloths which was wearing when spraying immediately	59.1	27.3	10.6	3.0
19. Washing cloths while wearing spray immediately	47.0	28.8	13.6	10.6
20. Storage pesticides in cabinets	27.3	22.7	21.2	28.8
21. Empty pesticide containers should be burned or buried	51.5	33.3	4.5	10.6
22. Wash hand and wash face with soup before having meal	74.2	22.7	1.5	1.5
23. Shower immediately after spray	75.8	21.2	1.5	1.5

*negative statement

Table 14 illustrates the respondents answered a total of 23 questions with the total score of 92. The distributions of attitudes of respondents, there were 20% of respondents who had “Good practice”, 85% of them had “Fair practice” and 6% of respondents had “Poor practice”. The average practice score for all respondents were 51.15 out of a possible 92 points.

Table 14: Distribution of practices towards using PPE

Practice level	**Number (n=330)**	**Percentage (%)**
Good practice (81%-100%)	20	6
Fair practice (60%-80%)	180	85
Poor practice (Less than 60%)	30	9

4.6 The association between knowledge and attitude, knowledge and practice, and attitude and practice

Knowledge, attitude and practice regarding to use of personal protective equipment were treated as Spearman's rank correlation coefficients. The association between knowledge and attitude, knowledge and practice, and attitude and practice were low positive correlation (Spearman's rank correlation coefficient 0.216, 0.285, and 0.305 respectively, *p-value* < 0.001).as show in table 15.

Table 15: Association among knowledge, attitude, and practice of using PPE

Variables	Statistic test	Spearman's rho
Knowledge & Attitude	Spearman's rank correlation	0.216*
Knowledge & Practice	Spearman's rank correlation	0.285*
Attitude & Practice	Spearman's rank correlation	0.305*

* Correlation was significant at the 0.01 level.

CHAPTER V

DISCUSSION

The purpose of this study was to evaluate the knowledge, attitude, and practice associated with pesticide use and exposure in chilli-growing farmers in in Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand. The total responsdents was 330 participants, indicating good intension to participate in this study.

5.1 Socio-Demographics

In this study, the results shown that approximately 53% of the participants were male and 47% were female. In general, there is a significant difference of pesticide use between male and female (Atreya, 2007).

This study revealed the age ranged from 24 to 70 years and the average age was 42 years. More than 70% of respondents were from 31 to 50 years and most of them were head of family and farm owner. These findings are similar to Recena et al., (2006); it showed that the average age was 43.6 years and 58.4% were from 31 to 50 years old and almost 70% of them were farm owners. Another study also revealed that the working group in cottage industries is in the range of 25 to 40 years (Yassin, et al., 2002). The chilli-growing farmers may lead to the fact that the workers had a longer exposure directly to toxic from pesticides. The reason for this difference is the chilli-growing farmers are a hard and poisonous work. Thus, men and family's header usually account for this risk work.

In this study, most of respondents (71.2 %) had educated in primary school. Low levels of education in agricultural communities have also been observed in other countries, in Brazil (Recena et al., 2006), 83.2% of the workers had less than 8 years of education. Atreya (2007) studied in Nepal reported more than 80% of females and more than 50% of males had less than 8 years of education. This is because the farmers were people in this area and they passed on knowledge and experienced to

their family. These works took much time of farmers in each family. Thus, most of the farmers in the study had educated in primary school only.

Another literature in Brazil reported the growers used high toxic insecticide (Recena et al., 2006). Similarly, the chilli-growing farmers have many pest problems in their farms such as insect, weed and plant disease. The popular pesticides used in chilli-growing farms were abamectin, selecron (profenofos) and podium 600 (chlorpyrifos) because the significant problem of chilli-growing farmers in this area was pest such as worm, aphid and plant louse.

From the interview, the application was spraying because it was convenient and appropriated to cover wide and large growing areas. From literature in Yassin et al., (2002), it reported the highest percentage of toxicity symptoms among the farmers. In our study, the self report of toxicity symptom associated with pesticide use, found the farmers never get of toxicity symptom. In this information, the respondent may gave the false data because of their recall bias; no one has noted evidences, and wide criteria of symptom classification. They can access many sources of pesticide information that illustrated nowadays the farmers have many alternative way to obtain the information.

5.2 Information regarding pesticides use

In this study, the problems of chilli-growing farmers were insects 84.8%, plant diseases 74.2% and weeds 60.6%. The common pesticide uses were abamectin 47%, selecron (profenofos) 23.3% and podium600 (chlopyrifos) 14.9%. Sematong, Zapuang and Kitana (2008) found most farmers used pesticides in their agricultural activity and the most common used were herbicides and insecticides (chlopyrifos). Another literature reported about 92% of the interviewees had worked directly with pesticides (Recena et al., 2006). Similarly, the results shown the chilli-growing farmers were mixing and spraying pesticides by themself 81.8%.

About toxicity symptoms associated with pesticide of this study, it found that more than half of respondents were never, 39.4% of them were some symptoms such as headache, fatigue, dizziness, stomach cramps and throat irritation, while only 3.0% were moderate symptom for example nausea, vomit, blur vision, shivering, constriction, cramp, hyperventilation. According to Recena et al., (2006), it found 59.6% of interviews reported symptoms after using pesticides. The health care provider, were health center 23.33%, by themselves 23.33%, herbal use by themselves 18.79%, and provincial hospital 11.21%. In this area, health center is convenient and nearest from their farms and their homes.

A study on KAP regarding pesticides in Lebanon (Salameh et al., 2003) found the agricultural workers who had long experience with pesticide application used fewer protective measures. For information on pesticides knowledge was received only by oral communication and poor protective measures. In this study, the majority of respondents in the study obtained information on pesticide knowledge via several informal sources i.e. agricultural officer 17.89% and television 15.75%, similar to another study in the field of cottage industries (Ignatius, Nga and Wang, 2005).

In this result, respondents had checked a level of cholinesterase blood in the last 12 months. 48.5% of them were in a normal level and 10.6% were over the limitation of cholinesterase in blood.

However, the respondents who did not have a cholinesterase in blood test in the last 12 months were 34.8%. Therefore it is suggested that the Provincial Agricultural Extension Office and Provincial Public Health Office of this local area should have an appropriated strategies concerning about knowledge of harmful effects of pesticides and their health service.

5.3 Knowledge of chilli-growing farmers regarding using PPE to prevent themselves from pesticides

Knowledge of the respondents Chilli-growing farmers were almost 89.4% recognized that they used mask, wearing boots and wearing cloth thoroughly. These findings are similar to the study in Ethiopia reported the common types of PPE provided in the farms were overalls, safety shoes, respirators, gloves and goggles (Mekonnen and Agonafir, 2002). As well as, Recena et al., (2006) found most of cases, the farmers wearing hats, but less than half wore boots and even fewer wore masks, gloves, or impermeable clothes, whereas a study in Nepal reported knowledge on pesticide use safety measures was extremely lacking. 76% of females and 63% of males do not have knowledge on protective equipment such as use of mask, gloves (Atreya, 2007).

Knowledge of the routes that pesticides can pass through their body, many respondents (83.3%) recognized that the pesticide can pass through their body by 3 routes; ingestion, dermal and inhalation agreed with other studies which have found that most occupational exposure to pesticides (Yassin, Abu Mourad, and Safi, 2002).

In terms of knowledge regarding of pesticide residues, most of respondents toward of pesticides were accumulate in the soil, water, air and plants were was relatively a consistent with a study from Gaza Strip (Yassin, Abu Mourad, and Safi, 2002). Another study found a majority of the farmers considered pesticides harmful to the environment, mainly to rivers, air and soil. Only a few of them believed that pesticides could reduce the quality of ground water (for wells) (Recena et al., 2006).

Regarding the knowledge of symptoms in long term pesticides exposure in this study were feeling dizzy and feel dry are typical of exposure to pesticides (Recena et al., 2006)..The toxicity symptoms were cold, breathlessness, chest pain, itching and skin irritation, headache and dizziness (Yassin, Abu Mourad, and Safi, 2002).

Knowledge of pesticides use reported more than half of respondents were used pesticides follow the label, were cleaning sprayer equipments with a detergent, shower and change cloths immediately after pesticide used and were change cloths

and shower immediately, when acute exposed of pesticide. This finding is consistent with the study from Brazil, found most of growers showering after working with pesticides and stated that they followed the label instructions (Recena et al., 2006). Whereas in Nepal, reported half on respondents were not showered after sprayed and third of them wear the same cloths continuously that was used in the spraying operation (Atreya, 2007). Knowledge about the effects of pesticides, quarter of respondents knew the pesticides were harmful to all living things. This is dissimilar in other countries reported ((Recena et al., 2006; Atreya, 2007; Yassin, Abu Mourad, and Safi, 2002).

Regarding knowledge of pesticides applications, few of them mixed all of pesticides in the container then extend to sprayer machine and discard the empty pesticide containers to local waste containers. A study on KAP regarding pesticides exposure in Brazil (Recena et al., 2006) reported that farmers used costal sprayer (manual application) and open-cabin tractor for pesticide application. According to (Recena et al., 2006) also found some of farmers were taken to the local waste containers.

During knowledge on considered the pesticides in this study, less than half of respondents were depend on date of manufacture and expire, on pest that they want to control and amount of pesticides that want to use. Only few of respondents knew that used pesticides depend on pest. This was relatively with a study in Nepal (Atreya, 2007) reported nearly 80% of respondents decide themselves on types, doses, frequency and timing of pesticides to be used. These finding require knowledge about pesticides use from Provincial Agricultural Extension Office in this area as well.

Knowledge of the respondent chilli-growing farmers in Hua Rua Sub-district regarding using personal protective equipment to prevent them from pesticide shown that more than 70% had low knowledge. This was relative with another study in Brazil (Recena et al., 2006), it found the growers used highly toxic insecticide, used low-technology and no personal protective equipment that means the growers had low knowledge. Yassin, Abu Mourad, and Safi (2002) reported knowledge of the respondent farm workers in the Gaza Strip about the effects of pesticide on human health and the names of pesticides used was relatively accurate, but knowledge

concerning biological and natural control was low. Atreya (2007), found both males and females had very low level of knowledge.

The majority of the knowledge distribution shown in low level because they are lacking of knowledge, had low education and had limited formal education. Again, this study recommend that the government authorities and community should have appropriate strategies to develop the education level in the rural area and add the knowledge on other alternatives for pest control and pesticide safety education.

5.4 Attitudes of chilli-growing farmers regarding using PPE to prevent themselves from pesticides

In the results, the respondents considered that pesticides harmful to the human health and environment. Similarly, a study of Recena et. Al., (2006) indicated almost of participants considered pesticides harmful to the health of workers who deal directly, consumer's health and the environment and in other countries reported (Atreya, 2007; Yassin, Abu Mourad, and Safi, 2002).

Attitude of the pesticides use regarding spraying pesticides shown that the farmers believed that spraying should be done in the windward direction and they have to use personal protective equipment (PPE as similar as a study on KAP regarding pesticides exposure in Brazil found the farmers were observed the wind direction (Recena et. Al., 2006) and the farmers were care of wind direction during spraying pesticides (Atreya, 2007).

Regarding attitude of chilli farmers with potential for exposure to pesticides shown that the respondents considered that used pesticides more than label recommendation for increase yield and stated to increase amount of pesticide anytime of use. This similar to Yassin, Abu Mourad, and Safi (2002), they found nearly half of respondents used more than the recommended concentration. Recena et al. (2006) reported most of agricultural workers followed the label instructions. In this result, showed that most of chilli farmers considered mixes various pesticides for increase effectiveness. This was related with a study in the Gaza Strip that reported the toxicity symptoms associated with pesticide exposure among farmers was related with concentration of pesticides used. They found the farmers who used over recommended concentrations of pesticides and the farmers who mix two or more pesticides were got higher toxicity symptoms (Yassin, Abu Mourad, and Safi, 2002).

Recena et al. (2006) found most of the agricultural workers stated that agricultural products that use pesticides might be harmful to consumer whereas in this study results showed that the respondents had not concerned about pesticides impacts can residues in agricultural product and its harm to consumer.

Most of respondents recognized that pesticide can pass through the body more than ingestion route. For other reported, the farmers were aware of dermal and respiratory exposure but not of ingestion (Salameh et al., 2003). For attitude of wearing cloths, the farmers not assured about wear clothing thoroughly while spraying pesticides, this was agreed with a study of Mekonnen and Agonafir (2002), reported the respondents were careful working with pesticides was more important than using personal protective equipment (PPE). The respondents were carefully considered on spraying pesticides without wearing protective equipment, need to shower immediately after the spray as a preventive alternative, this was related with another literature reported; the farmers believed that washing would remove pesticides from contaminated body surfaces and most of them showering after working with pesticides but only few of them did not have a problem with pesticide exposure (Mekonnen and Agonafir, 2002; Recena et al., 2006).

Regarding attitude of mixing pesticides, results showed the respondents were mix pesticides in pesticide container before fill water for mixing pesticides. And they did not used wood-based for mixing pesticides. The result that a high proportion of farm workers were more aware of inhalational and dermal absorption of pesticides than other routes of exposure agreed with other studies which have found that most occupational exposure to pesticides occur from skin absorption and through inhalation (Yassin, Abu Mourad and Safi, 2002).

The respondents did not concern about attitude regarding pesticides used, they considered with high cost chemicals are more effective to control pest than cheaper chemicals. For other attitudes, they considered with daily exercise can help to excreting pesticides out off their body through sweat. Moreover they thought that drink water or coconut juice can excrete pesticides toxicity as well. The agricultural workers should access regarding attitude of pesticides use and protective measures.

For the attitude of the respondent chilli-growing farmers in Hua Rua Sub-district regarding using personal protective equipment to prevent them from pesticide, the farmers did not concerned attitude and neutral attitude about pesticide use and exposure. This similar to other studies in Gaza Strip, it was reported a high percentage of the interviewed farm workers believed that their bodies could develop resistance

against pesticides. This was negative attitudes and may be the cause of decrease towards the use of protective equipments (Yassin, Abu Mourad and Safi, 2002) and a study in Ethiopia reported of using personal protective equipment was a problem in some of the farms. Even though contaminate of the skin is a major route that pesticide can pass through their body; some of farmers were averse to wear gloves in hot weather. This shown negative attitude towards protective measures (Mekonnen and Agonafir, 2002).

Lack of knowledge of the pesticides use was the reason to reluctant other alternatives for pest control. Furthermore, a high percentage of the respondents believed that used pesticides more than label recommendation may increase yield and mix various pesticides will increase effectiveness and that no disadvantage. As attitudes may further encourage farm workers to be unconcern to the use of protective measures.

5.5 Practices of chilli-growing farmers regarding using PPE to prevent them from pesticides

In this study, most of the respondents were shower immediately after the spray, were wash their hand and wash face with soup before having meal after using pesticide. And they checked their equipment and material before using and wore cloth thoroughly while spraying. More than half of them wear boot while spraying, remove cloths which was wearing when spraying immediately, wear gloves and mask when mixing pesticides. Another study in Thailand reported that less than half of farmers were protective clothing and gear (long sleeved shirts, long pants, boots and mask) while spraying pesticides and were wash their hand or shower and wash their cloths after spraying (Sematong, Zapuang and Kitana, 2008). Recena et al. (2006) found that the equipment used to apply the pesticides was washed with a water hose near house or in the field, using water from the river or from the wells. But less than half of participants wore boots and even fewer wore masks, gloves, or impermeable clothes. Most of them reported washing their hands, changing clothes, and showering after working with pesticides. On the other hand, a study in Nepal, most of individuals have not had shower after sprays. However, they wash their hands with soap and wear the same cloth continuously that was used in the spraying. Even though very few individuals had separated body covers (like long-sleeved shirt, pant and shawl) for spraying purposes (Atreya, 2007). Faria et al. (2000) reported that in southern Brazil, over 50% of the agricultural workers reported using boots, hats, gloves, masks, and thicker or impermeable clothes during pesticide application. A study in Lebanon, it found that most of respondents were took a shower at the end of their work shift. In contrast, more than half of them were not cleaned clothes and underwear separately from other clothes, had clothing facilities on the work site, and wore hats (Salameh, Baldi, Brochard and Saleh, 2003). In addition, Recena et al. (2006) reported that the respondents not washing their hands were intoxication symptoms than those who wash their hands.

In this study, it was found that more than half of respondents never had smoking or drinking water while spraying pesticides. Most of them avoided eating during pesticide application and were prohibiting human and animal from spraying area. In addition, most of them were storage of pesticide products on their farms. As same as Atreya (2007) reported that almost all males and females did not smoke, drink and eat during pesticides application. A study in Lebanon found that majority were stored pesticides away from food and did not eat during application. A lower proportion that the respondents agree was did not smoke during spraying application (Salameh et al., 2003).

Furthermore this study found that more than half of respondents were read instruction label before use and mix pesticides following recommendation dose and noticed about appropriate type of pesticide. It is different from Mekonnen and Agonafir (2002), it reported that most of them could not read or understand instructions on pesticide packages. Approximately 40% of respondents mix many kind of pesticide for increasing an effectiveness of weed and pest eradication. Half of respondents never had inhale pesticide for checking the quality of pesticides. Less than half of respondents selected pesticide by neighbors recommended, advertising, and price. In another study in Nepal reported most of respondents decided themselves on types, doses, frequency and timing of pesticides to be used (Atreya, 2007).

Less than half of respondents sprayed pesticide on windward direction, without any protective equipment. Half of respondents were not spraying pesticides when it is windy or stormy. Atreya (2007) found that some participants did not account for wind direction during spraying pesticides whereas a study in Lebanon reported a great proportion was applied pesticides with the wind direction (Salameh, Baldi, Brochard and Saleh, 2003).

In term of practice regarding use of protection equipments during pesticides mixing shown that more than half of respondents did not mix pesticides by hand. It was related to a study in Ethiopia reported during pouring and loading by hand, pesticides could also come into contact with the hands or other parts of the body of the sprayers. Pesticide exposure is increased by such inappropriate practices (Mekonnen and Agonafir, 2002).

For practice for disposing of pesticides containers showed that more than half of them burned or buried the empty pesticide containers. About 30% of them were cleaning pesticide applicators with detergent before storage. Less than 50% of them did not discard pesticide containers in the river after used. Approximately 40% of respondents were cleaning pesticide containers in the river after used**.** A study in Lebanon reported the proportion of good practice represented less than half of individuals' habits (digging special holes, incineration). The majority of them discarded pesticide container wastes into the environment (soil or water) or with other trash and few of them used containers for storing water or food (Salameh, Baldi, Brochard and Saleh, 2003). Atreya (2007) found more than half females and 38% of males used pesticide-contaminated utensils for other purposes, for example in latrine,, livestock, and in kitchen. Moreover, Recena et al., (2006) found the most farmers disposed the empty pesticide containers within the farm by burned, burying, leaving it in the field, or reutilization for other purposes (e.g., for food and water storage) and some farms were taken to the local waste containers.

Practice of the respondent chilli-growing farmers in Hua Rua Sub-district; shown that 85% of them had fair practice regarding using personal protective equipment to prevent them from pesticide exposure. Result of some studies in developing countries were similar, especially on use protective measures; because of most users in such nations are low educated, lack of knowledge and poor. Furthermore, there are lack of institutions for regulating pesticide use and sales and weak dissemination networks (Recena et al., 2006; Yassin et al., 2002). The high cost of PPE was mentioned as an important factor limits their use (Yassin et al., 2002). Mekonnen and Agonafir (2002) found that most of respondents can not read or understand instructions on pesticide label.

5.6 The association between knowledge and attitude, knowledge and practice, and attitude and practice

The association between knowledge and attitude, knowledge and practice, and attitude and practice were a little positive correlation (Spearman's rank correlation coefficient 0.216, 0.285, and 0.305 respectively, *p-value* < 0.001).

According the results on socio-demographic, most of respondents had educated in primary school. Normally, this information demonstrate situation in farmer's society and rural area of Thailand. Farmers with low formal education should be at higher risk regarding using pesticides, due to difficult to understanding the methods of using pesticides and safety practices on the product labels. The current study shows that the higher percentage of the agricultural workers uses pesticides. Lack of knowledge of the pesticides use was the reason to reluctant other alternatives for pest control.

Some farmer's attitudes were based on learning from their community (neighbors, family, and local belief) and no technical basis. Example of these included drink soft drink after spraying to excrete pesticide toxicity, drink concentrated salt water, lemonade and coconut juice to excrete pesticide toxicity. Furthermore, high percentage of the respondents believed in negative attitudes statement may encourage agricultural workers to be unconcern to the use of protective measures.

In general, the farmers were aware of practice for safe uses include reading and following instructions on pesticides label. Even though the farmers had to awareness of the pesticides could harmful to their health, the use of personal protective equipment (PPE) during pesticide application was not a common practice. Moreover, a high percentage in negative statement practice of the respondent chilli farmers, such as stored the pesticide containers in their farms or inappropriate discard of the empty pesticide containers. These practices could put the general population at risk.

In this study, we did not explore the reason why awareness does not necessarily translate into action, but this point needs further investigation and could be the subject of future research.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The assessment of the level of knowledge, attitude and practice of using Personal Protective Equipment (PPE) for chilli-growing farmers in Huarua Sub-District, Mueang District, Ubonrachathani Province, Thailand according to prevent them from health effect of pesticide could be concluded that the standardized questionnaire was completed by face to face interviewing from 330 chilli-growing farmers. The results showed that approximately 53% of the participants were male and 39.6% of their ages were in the range of 31-40 years old. 71.2 % of respondents had educated in primary school. Most of them owned the properties where they worked. Common pesticides used during growing season were abamectin, selecron (profenofos) and podium600 (chlorpyrifos). Most of respondents were applied pesticides bythemself. 57.6% of them never had toxic symptoms that associated with pesticides use. The health care services where the respondent access was health center 23.33%. The information sources which the respondents obtain pesticide knowledge information were agricultural officer 17.89% and television 15.75%. The respondents almost 89.4% knew that they have to wear mask, boots and closely wear cloths. Many respondents (83.3%) knew the routes that pesticide can into their body. But most of them did not know how to use pesticide correctly and how to remove the exhausted pesticide's package. 45.5% of respondents knew that when spraying pesticides windward direction have to use PPE but 40.9% of respondents agreed that used pesticides more than the recommendation dose may increase their crop yield. Many of respondents usually shower immediately after spraying, they washed hand and face with soup before having meal after using pesticide. As well as they checked spraying equipment and material before using and wear cloth thoroughly while spraying. Knowledge, attitude and practice regarding to use of personal protective equipment were tested the relationship with Spearman's rank correlation. Most of the respondents had "Low knowledge", "Not concern attitude" and "Fair practice". The

association between knowledge and attitude, knowledge and practice, and attitude and practice were significantly low positive correlation (Spearman's rank correlation coefficient 0.216, 0.285, and 0.305, respectively, *p-value* < 0.001).

6.2 Recommendations and suggestions

Using safety practices, it would be helpful to improve better occupational health and quality of life among the chilli-growing farmers. In general, personal protective equipment (PPE) like respirator, hand and arm protection, eye protectors, foot and clothing protection were not accepted by the farmers due to improper fitting and hindrance of their work efficiency. Thus, there is a need for improving these devices or redesigning the device to ensure the chilli-growing farmers to use them effectively.

Therefore, it is should be developed evidence-based methods, which can assess the occupational health risk. The intervention tools should be developed for enhancing the suitable practice for PPE using and improve the quality assured information still need to give better advice to growers. Meanwhile, all the growers should be trained in the use of personal protective devices.

An appropriated policy on the basis of the findings in this study, the issues should be considered for improving knowledge of chilli-growing farmers of harmful effects of pesticide and importance of using PPE at work following:

1. Public education is necessary to address the knowledge gap revealed in the study. Therefore educational programs should be organized for improving knowledge about harmful effects of pesticide and it should focus mainly on increasing the awareness of the people of the importance of using PPE.

2. Local authority should operate the village radio system to raise awareness and knowledge of the chilli-growing farmers, in particular, not only harmful effects of pesticide but also other health information. Besides, basic knowledge of good effects of using PPE to protect chilli-growing farmers from their work should also be given to them.

3. To improve and develop agriculture occupational networks, services of agriculture health should be organized. For example, health officers and agricultural officers in this area should concern more about diseases that farmers may get from their occupation.

4. Free publishing materials concerning to education, training and specific information on occupational health be effected. For example, poster and leaflet.

6.3 Limitation

This study was conducted for specific agricultural activity only in Hua Rua sub-district, Muang district, Ubonratchathani Province, Thailand. Thus, it may not be generized as a representative of other agricultural farms in Thailand.

The biases of self-report should also be recognized because the farmers may not tell the truth to the researcher.

6.4 Further study

This study was reported on KAP of using PPE focusing on chilli-growing farmers in Hua Rua sub-district, Muang district, Ubonratchathani Province, Thailand.

In fact, there are other agricultural farms in Thailand that could be studied by applying the advantage of this study as a general guideline for other agriculture and different groups of the farmers.

Risk assessment should apply to the community, to estimate pesticide exposure through dermal, oral, inhalation contact.

Furthermore, future researches should be concerned about disease, factors hindering practices and behavioral changes in order to develop the effective and reliable implementation program to avoid the harmful effects and prevent risks caused by several occupational diseases.

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APPENDICES

APPENDIX A:

QUESTIONNAIRE (English version)

Chilli-Growing Farmers Questionnaire

In Hua Rua sub-district, Muang district, Ubonratchathani Province, Thailand

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Description

1. Questionnaire for interview only chilli-growing farmers
2. Questionnaires are total 12 pages. Consisted with 5 parts as following:

Part1: Socio-demographics (16 items).

Part2: Information regarding pesticide use (8 items).

Part3: Knowledge regarding using PPE to prevent themselves from pesticide (15 items).

Part4: Attitude regarding using PPE to prevent themselves from pesticide (15 items).

Part5: Practice of using PPE to prevent them from pesticide (23 items)

Total 77 items

3. Place an (/) in the ❍
4. "Pesticide" mean chemical that use to control pest; insecticide, herbicide and fungicide

Name…….....Interviewee

Address……Village…Moo…Hua Rua sub-district, Muang district, Ubonratchathani Province

Name……..…….…….……...Date……Interviewer

Interviewee's Signature.....

<u>Part 1</u> Socio demographics

1.1 Age..... Years

1.2 Gender ❍1 Male ❍ 2 Female

1.3 Marital Status ❍1 Single ❍ 2 Couple ❍ 3 Widow

1.4 Weight.....kilograms

1.5 How many members in your family? (including interviewee) .....person(s)

1.6 How many members in your family? (including interviewee).....person(s)

1.7 How long do you live in this village? .....years

1.8 How long have you been working in chilli-growing farmers? .....years

1.9 How many year(s) do you apply pesticide in your farms? .....years

1.10 How many times do you use pesticide? .....time(s)/year

1.11 Status in family

❍ 1 Head of family ❍ 2 Couple of head

❍ 3 Child ❍ 4 Parent

❍ 5 Cousin ❍ 6 Occupant

❍ 7 Worker ❍ 8 Other .....

1.12 Educations

❍ 1Never ❍ 2 Primary school

❍ 3 Secondary school ❍ 4 High school

❍ 5 Diploma ❍ 6 Bachelor's degree

❍ 7 Higher Bachelor's degree❍ 8 Other .....

1.13 Income/Expenses (Bath/year)

Income			Expenses		
No	List	Amount (Bath)	No	List	Amount (Bath)
1			1		
2			2		
3			3		
Total			Total		

1.14 Farm's owner

- ❍ 1 Yes
- ❍ 2 No

1.15 How many times do you have growing chilli? .....time(s)/year

1.16 How many farm areas do you have? ..... rais

<u>Part2</u> Information regarding pesticide use

2.1 Chilli-growing farmers ‘s Problem

- Insect problem
  1) …….....
  2) ……
  3) ……

- Weed problem
  1) …….....
  2) ……..
  3) ……..

- Plant disease problem
  1) …….....
  2) ……
  3) ……

- Animal problem
  1) …….....
  2) ……
  3) ……

2.2 Information of pesticide use of the chilli-growing farmers

No.	Commonly used chemical	Amount of pesticide (kilograms, liter / rai)	Cost (Bath)	Month
1				
2				
3				
4				
5				

2.3 Do you mix or spraying the pesticides by your self?

- ❍ 1 Yes
- ❍ 2 No

2.4 Do you have congenital disease?

- ❍1 No
- ❍2 Yes.....years

2.5 Do you get the toxicity symptom associate with pesticides?

- ❍ 1 Never (Go to 2.7)
- ❍ 2 Few symptoms

  (Headache, fatigue, dizziness, stomach cramps and throat irritation)
- ❍ 3 Moderate symptoms

  (Nausea, vomit, blurs vision, shivering, constriction, cramp, and hyperventilation)
- ❍ 4 Nervous symptoms

  (Contracted pupils of the eye, excessive sweating and salivation)

2.6 How to treat toxicity symptom associated with pesticide?

- ❍ 1 By my self
- ❍ 2 Herbal uses by my self
- ❍ 3 Alternative medicines
- ❍ 4 Health center
- ❍ 5 Private clinics
- ❍ 6 District hospitals
- ❍ 7 Provincial hospitals

2.7 Source of pesticide information

- ❍ 1 Radio
- ❍ 2 Televisions
- ❍ 3 Document/article
- ❍ 4 Broadcast towers
- ❍ 5 Neighbors
- ❍ 6 Agricultural officers
- ❍ 7 Public health officers
- ❍ 8 Pesticide salesmen
- ❍ 9 Community headers

❍ 10 Health volunteer

2.8 Have you had a cholinesterase test in the last 12 months?

❍1 Never

❍2 Yes but not know result

❍3 Yes and normal

❍4 Yes and not normal

❍5 Yes with health effects

<u>Part3</u> Knowledge regarding using PPE to prevent themselves from pesticide

3.1 How many routes that the pesticides can pass through the body? What?

- ❍1. 1 route: ingestion
- ❍2. 2 routes: ingestion and inhalation
- ❍3. 3 routes: ingestion, inhalation and dermal
- ❍4. cannot into the body

3.2 What is disadvantage of pesticide use?

- ❍ 1 Harmful to the health of consumer
- ❍ 2 Harmful to all living things
- ❍ 3 Harmful to environment
- ❍ 4 No disadvantage

3.3 How to use the pesticide properly?

- ❍ 1 Selected to match the pest
- ❍ 2 Selected by neighbor's recommended
- ❍ 3 Selected the pesticides that can be control various pest
- ❍ 4 Selected by the advertising

3.4 When you want to buy pesticide, how do you consider?

- ❍ 1. Date of manufacture and expire
- ❍ 2. Selected the pesticides that appropriate with pest and amount of pesticides that want to use
- ❍ 3. Selected the pesticides that can be control various pest
- ❍ 4. 1 and 2 are corrected

3.5 How to known toxicity of pesticide?

- ❍ 1 From the label or the symbol of figure skull
- ❍ 2 From colors on the label, show toxicity of pesticides
- ❍ 3 From the smell; if pesticide has malodor is severe danger
- ❍ 4 Enquire or acknowledge from neighbor

3.6 What is the correct method of pesticide use?

- ❍ 1 Increase amount of pesticides more than label indicates when more pests.
- ❍ 2 Follow the label
- ❍ 3 Using various pesticides to prevent resistance
- ❍ 4 Using various pesticides to increase effectiveness of pesticides

3.7 How to proper mix of pesticides?

- ❍ 1 Fill all of pesticides in the sprayer machine and fill water
- ❍ 2 Mix all of pesticides in the container then fill in the sprayer machine
- ❍ 3 Fill water in the sprayer machine first, and fill all of pesticide then shake the application to dissolve water and pesticides together
- ❍ 4 Mix all of pesticides in the container then extend to sprayer machine

3.8 After spraying, where is the pesticide residual?

- ❍ 1 Accumulate in the soil, water, air and plants were sprayed
- ❍ 2 Accumulate in the soil, water and air
- ❍ 3 Accumulate in plants were sprayed
- ❍ 4 No accumulated

3.9 When you were spraying pesticide, what is the properly practice?

- ❍ 1 Use mask, were boots and wear clothing thoroughly
- ❍ 2 Smoking to prevent the pesticides from breath
- ❍ 3 Spraying windward direction without use protective equipment
- ❍ 4 Spraying without use protective equipment.

3.10 What are the properly practices after pesticide used?

- ❍ 1 Cleaning sprayer equipments in river or canal
- ❍ 2 Cleaning sprayer equipments with a detergent, shower and change cloths immediately
- ❍ 3 Take a bath, wearing the same cloths and work ahead
- ❍ 4 Wearing the same cloths and work ahead

3.11 How to storage the pesticide after used?

- ❍ 1 Stored in the kitchen
- ❍ 2 Stored in medicine cupboard
- ❍ 3 Stored in their farms site
- ❍ 4 Separate to stored in pesticide cabinet and lock

3.12 How to dispose the empty pesticide containers?

- ❍ 1 Burned or buried
- ❍ 2 Dispose to the river
- ❍ 3 Cleaning and keep
- ❍ 4 Dispose to local waste containers

3.13 What is the symptom of long term pesticide exposure?

- ❍ 1 Anxious, delirious
- ❍ 2 Abdominal pains, dizzy
- ❍ 3 Feel dizzy, feel dry
- ❍ 4 No symptom

3.14 How to practice the first aid treatment, in case of acute exposed pesticide?

- ❍ 1 Take medicine by self
- ❍ 2 Change cloths and shower immediately
- ❍ 3 Loosen cloths
- ❍ 4 Let cloths dry naturally

3.15 How to practices the first aid treatment, in case of drink pesticide?

- ❍ 1 Vomit
- ❍ 2 Eat albumins
- ❍ 3 Drink warm concentrate salty water (salt 1 table spoon)
- ❍ 4 Perform all of the above, respectively

<u>Part4</u> Attitude regarding using PPE to prevent themselves from pesticide

No.	Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
4.1	Pesticide can pass through the body only ingestion route					
4.2	Pesticide harmful to insect into, not harmful to human health					
4.3	Increase amount of pesticide anytime of use to prevent resistance					
4.4	Mix various pesticides will increase effectiveness and no disadvantage					
4.5	Using wood-based to mix the pesticides is safety than using hand					
4.6	Use pesticides more than label recommendation may increase yield					
4.7	If you stand windward direction when spraying pesticide, don’t concern about clothes					
4.8	Pesticides are harmful to the human health and environment					
4.9	Drink coconut juice after exposed pesticide for excreting pesticide toxicity					
4.10	Drink water after exposed pesticide for excreting pesticide toxicity					
4.11	Exercise can help to excreting pesticide toxicity through sweat					

No.	Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
4.12	While you are spraying pesticide, you should not wear clothing thoroughly					
4.13	Pesticide can residues in agricultural product and its harm to consumer					
4.14	Expensive chemicals are effective to control pest better than cheap chemicals					
4.15	If spraying chemical without wearing protective equipment, must shower immediately after the spray as a preventive alternative					

<u>Part5</u> Practice of using PPE to prevent them from pesticide

Period of time (using pesticides) Year..... From (month).....To.....

No.	Questions	Usually	Sometime	Rarely	Never
Before spraying					
5.1	Learn about appropriate type of pesticide				
5.2	Select pesticide by neighbor's recommended/ advertising/ price				
5.3	Read label before use and follow recommendation all steps				
5.4	Check equipment and material before using				
5.5	Avoided human and animal from spraying area				
5.6	Wear gloves and mask when mixing pesticides				
5.7	Inhale pesticide for confirming real or fake pesticide				
5.8	Mix pesticide by hand				
5.9	Mix various pesticide for increase effective eradication of weed and pest				
Spraying					
5.10	Wear clothing thoroughly while spraying				
5.11	Wear boot while spraying				
5.12	Smoking or drinking while spraying				
5.13	Spray pesticide while windy				
5.14	Stand windward direction while spraying, with out protective equipment				
After spraying					
5.15	Cleaning pesticide container in the river after				

No.	Questions	Usually	Sometime	Rarely	Never
	used				
5.16	Dispose pesticide containers in the river after used				
5.17	Cleaning pesticide applicators with detergent before storage				
5.18	Remove cloths which was wearing when spraying immediately				
5.19	Washing cloths while wearing spray immediately				
5.20	Storage pesticides in cabinets				
5.21	Empty pesticide containers should be burned or buried				
5.22	Wash hand and wash face with soup before having meal				
5.23	Shower immediately after spray				

QUESTIONNAIRE (Thai version)

แบบสัมภาษณ์เกษตรกรชาวไร่พริก

ในการทำไร่พริกของเกษตรกรในพื้นที่ อำเภอหัวเรือ จังหวัดอุบลราชธานี

คำชี้แจง

1. แบบสัมภาษณ์ที่ใช้สัมภาษณ์เฉพาะเกษตรกรผู้ทำไร่พริก

2. แบบสัมภาษณ์นี้มีจำนวนทั้งสิ้น จำนวน 12 หน้า แบ่งออกเป็น 5 ส่วน ดังนี้

ส่วนที่ 1 ข้อมูลทั่วไป จำนวน 16 ข้อ

ส่วนที่ 2 ข้อมูลศัตรูพืชและการใช้สารกำจัดศัตรูพืช จำนวน 8 ข้อ

ส่วนที่ 3 ข้อมูลด้านความรู้เรื่องการใช้สารกำจัดศัตรูพืช จำนวน 15 ข้อ

ส่วนที่ 4 ข้อมูลด้านความเชื่อและทัศนคติในการใช้สารกำจัดศัตรูพืช จำนวน 15 ข้อ

ส่วนที่ 5 ข้อมูลด้านการปฏิบัติตนในการใช้สารกำจัดศัตรูพืช จำนวน 23 ข้อ

รวมทั้งสิ้น จำนวน 77 ข้อ

3. ให้ใส่เครื่องหมาย (/) ลงใน ❍ หน้าข้อความ และ เติมข้อความในช่องว่าง (……)

4. คำ ว่า "**สารเคมีกำจัดศัตรูพืช**" ในแบบสัมภาษณ์ หมายถึง สารเคมีที่ใช้ในการกำจัดศัตรูพืช ซึ่งได้แก่ ยาปราบวัชพืช ยาฆ่าหญ้า ยาฆ่าแมลง ศัตรูพืช ยาฆ่าเชื้อรา ยกเว้น สารเคมีที่ใช้ในการบำรุง หรือเสริมเพื่อการเพิ่มผลผลิต

ชื่อ.....สกุล.....ผู้ให้สัมภาษณ์

บ้านเลขที่……...บ้าน….....หมู่ที่…..…ตำบล หัวเรือ อำเภอ เมือง จังหวัด อุบลราชธานี

ชื่อ……..……..…สกุล.....……..…..……วัน/เดือน/ปี……ผู้สัมภาษณ์

ลายมือชื่อผู้ถูกสัมภาษณ์แสดงความยินดีและยินยอมในการให้ข้อมูล……...

<u>ส่วนที่ 1</u> ข้อมูลทั่วไป

1.1 อายุ ..... ปี

1.2 เพศ ❍1 ชาย ❍ 2 หญิง

1.3 สถานภาพ ❍1 โสด ❍ 2 คู่ ❍ 3 หม้าย

1.4 น้ำหนัก.....กิโลกรัม

1.5 จำนวนสมาชิกในครัวเรือน .....คน

1.6 จำนวนสมาชิกในครัวเรือนที่ทำไร่พริก .....คน

1.7 ท่านอยู่ในชุมชนนี้มากี่ปี.....ปี

1.8 ท่านทำไร่พริกมานานกี่ปี.....ปี

1.9 ท่านใช้สารเคมีกำจัดศัตรูพืชมาทั้งสิ้นกี่ปี.....ปี

1.10 จำนวนครั้งที่ท่านใช้.....ครั้ง/ปี

1.11 สถานภาพในครอบครัว

❍ 1 หัวหน้าครอบครัว ❍ 2 คู่สมรส

❍ 3 บุตร ❍ 4 บิดา / มารดา

❍ 5 ญาติ ❍ 6 ผู้อาศัย

❍ 7 คนงาน / ลูกจ้าง ❍ 8 อื่นๆ.....

1.12 ระดับการศึกษา

❍ 1ไม่ได้เรียน ❍ 2 จบประถมศึกษา (ป 1 – ป 6)

❍ 3 จบมัธยมต้น/เทียบเท่า ❍ 4 จบมัธยมปลาย/ปวช/เทียบเท่า

❍ 5.จบอนุปริญญา/ปวส ❍ 6 จบปริญญาตรี/เทียบเท่า

❍ 7 สูงกว่าปริญญาตรี ❍ 8 อื่นๆ (ระบุ).....

1.14 รายได้-รายจ่าย ครัวเรือนเฉลี่ย / ปี (จากการทำไร่พริก)

รายได้ครัวเรือนเฉลี่ย.....บาท / ปี			รายจ่ายครัวเรือนเฉลี่ย.....บาท / ปี		
ที่	รายการ	จำนวน (บาท)	ที่	รายการ	จำนวน (บาท)
1			1		
2			2		
3			3		
รวม			รวม		

1.14 ที่ดินในการทำไร่พริกเป็นของตนเองหรือไม่

❍ 1 ใช่

❍ 2 ไม่ใช่

1.15 ปลูกพริกกี่ครั้งต่อปี.....ครั้ง/ปี

1.16 ที่ดินที่ใช้ทำไร่พริกในครัวเรือนทั้งหมดกี่..... ไร่

<u>ส่วนที่ 2</u> ข้อมูลการใช้สารเคมี

2.2 ปัญหาศัตรูพืชในไร่พริกของท่านคืออะไร (ท่านสามารถตอบได้มากกว่า 1 ข้อ)

- ❍ แมลง (ระบุ)
  - 1) …….....
  - 2) ……
  - 3) ……
- ❍ วัชพืช (ระบุ)
  - 1) …….....
  - 2) ……..
  - 3) ……..
- ❍ โรคพืช (ระบุ)
  - 1) …….....
  - 2) ……
  - 3) ……
- ❍ สัตว์ (ระบุ)
  - 1) …….....
  - 2) ……
  - 3) ……

2.2 สารเคมีกำจัดศัตรูพืชที่ท่านใช้ ในการทำไร่พริกคือ (สามารถระบุได้มากกว่า 1 ชนิด)

ที่	ชื่อสารเคมี	ปริมาณสารเคมีที่ใช้ทั้งหมด ในการทำไร่พริกใน 1 รอบการเพาะปลูก (กิโลกรัม, ลิตร / ไร่)	ราคาทั้งหมด (บาท)	เดือนที่ใช้สารเคมี (เดือนอะไร)
1				
2				
3				
4				
5				

2.3 การพ่นสารกำจัดศัตรูพืชในไร่พริก ใครเป็นผู้ทำการฉีดพ่น (สามารถตอบได้มากกว่า 1 ข้อ)

❍ 1 ฉีดพ่นเอง

❍ 2 จ้างบุคคลอื่นฉีดพ่นให้

2.4 ท่านมีโรคประจำตัวหรือไม่

❍1 ไม่มี

❍2 มี (ระบุ).....เป็นเวลา.....ปี

2.5 ท่านเคยมีลักษณะอาการของการเกิดพิษจากสารกำจัดศัตรูพืช หรือไม่

❍ 1 ไม่เคย (ข้ามไปข้อ 2.7)

❍ 2 เคยมีอาการเล็กน้อย

(ปวดศีรษะ อ่อนเพลีย มึนงง เหงื่อออก น้ำตาไหล ระคายคอ คลื่นไส้)

❍ 3 เคยมีอาการปานกลาง

(คลื่นไส้ อาเจียน ตามัว ตัวสั่น แน่นหน้าอก ตะคริว หายใจถี่ เกิดอาการทางประสาท ม่านตาหรี่ เหงื่อออกมาก)

❍ 4 เคยมีอาการรุนแรง

(หายใจไม่สะดวก เป็นลม ชัก หมดสติ ชีพจรเต้นช้า หัวใจล้มเหลว สั่นตามกล้ามเนื้อ)

2.6 ท่านแก้ปัญหาเมื่อมีอาการแพ้สารกำจัดศัตรูพืชอย่างไร (ตอบได้มากกว่า 1 ข้อ)

❍ 1 ปล่อยให้หายเอง

❍ 2 ซื้อยามากินเองหรือรักษากันเองโดยสมุนไพร

❍ 3 ไปหาหมอพื้นบ้าน หรือเพื่อนบ้านช่วยรักษาให้

❍ 4 ไปสถานีอนามัย

❍ 5 ไปคลินิกเอกชน

❍ 6 ไปโรงพยาบาลอำเภอ

❍ 7 ไปโรงพยาบาลจังหวัด

2.7 ท่านเคยได้รับข่าวสารในเรื่องเกี่ยวกับสารเคมีกำจัดศัตรูพืชจากแหล่งใด (ตอบได้มากกว่า 1 ข้อ)

❍ 1 วิทยุ

❍ 2 โทรทัศน์

❍ 3 เอกสาร / สิ่งพิมพ์

❍ 4 หอกระจายข่าวในหมู่บ้าน

❍ 5 เพื่อนบ้าน

❍ 6 เจ้าหน้าที่เกษตร

❍ 7 เจ้าหน้าที่สาธารณสุข

❍ 8 ผู้จำหน่ายสารเคมี

❍ 9 ผู้นำชุมชน

❍ 10 อาสาสมัครสาธารณสุข

2.8 ในรอบ 1 ปี ที่ผ่านมา ท่านเคยตรวจเลือดหาสารเคมีตกค้างหรือไม่

❍1 ไม่เคย

❍2 เคย แต่ไม่ทราบผล

❍3 เคย แต่ผลปกติ

❍4 เคย และพบว่ามีการสะสม

❍5 เคย และพบว่าไม่ปลอดภัย

<u>ส่วนที่ 3</u> ความรู้เรื่องการใช้สารกำจัดศัตรูพืช

3.1 สารเคมีกำจัดศัตรูพืชสามารถเข้าสู่ร่างกายได้กี่ทาง ทางใดบ้าง

- ❍ 1 ทาง คือ ทางปาก
- ❍ 2 ทาง คือ ทางปาก ทางลมหายใจ
- ❍ 3 ทาง คือ ทางปาก ทางผิวหนัง ทางลมหายใจ
- ❍ 4 ไม่สามารถเข้าสู่ร่างกายได้

3.2 การใช้สารเคมีกำจัดศัตรูพืชมีผลเสียอย่างไร

- ❍ 1 เป็นอันตรายต่อร่างกายของผู้รับประทาน
- ❍ 2 เป็นอันตรายต่อสิ่งมีชีวิตทุกชนิด
- ❍ 3 มีผลเสียต่อสิ่งแวดล้อมเท่านั้น
- ❍ 4 ไม่มีผลเสีย

3.3 ท่านมีวิธีการเลือกใช้สารเคมีกำจัดศัตรูพืชที่ถูกต้องควรทำอย่างไร

- ❍ 1 เลือกให้ตรงกับแมลงศัตรูพืช
- ❍ 2 เลือกโดยเพื่อนบ้านแนะนำ
- ❍ 3 เลือกชนิดที่สามารถกำจัดศัตรูพืชได้หลายอย่าง
- ❍ 4 เลือกชนิดที่มีการโฆษณา

3.4 การเลือกซื้อสารเคมีกำจัดศัตรูพืช ท่านควรพิจารณาองค์ประกอบของผลิตภัณฑ์อย่างไรบ้าง

- ❍ 1 ดูวัน เดือน ปี ที่ผลิต และหมดอายุ
- ❍ 2 เลือกซื้อให้ตรงประเภทที่ต้องการใช้ และคำนวณปริมาณที่ต้องการใช้
- ❍ 3 เลือกชนิดที่สามารถกำจัดศัตรูพืชได้หลายอย่าง
- ❍ 4 ถูกทั้งข้อ 1 และ 2

3.5 ท่านทราบได้อย่างไรว่าสารเคมีกำจัดศัตรูพืชชนิดใดมีอันตรายต่อร่างกาย มากน้อยอย่างไร

- ❍ 1 อ่านจากฉลาก หรือ ดูจากรูปสัญลักษณ์รูปหัวกระโหลก
- ❍ 2 ระดับสีของฉลาก แสดงความเป็นพิษของสารกำจัดศัตรูพืช
- ❍ 3 ทราบได้จากกลิ่น เช่น ถ้ามีกลิ่นรุนแรงจะมีอันตราย
- ❍ 4 สอบถามหรือรับทราบจากเพื่อนบ้าน

3.6 วิธีการใช้สารเคมีกำจัดศัตรูพืชที่ถูกต้อง ควรปฏิบัติอย่างไร

- 1 เมื่อศัตรูพืชมากจะใช้สารเคมีมากกว่าฉลากที่ระบุ
- 2 ใช้ตามฉลากระบุ
- 3 ใช้สารเคมีหลายชนิดรวมกันเพื่อป้องกันการดื้อยา
- 4 ใช้สารเคมีหลายชนิดรวมกันเพื่อเพิ่มประสิทธิภาพของยา

3.7 การผสมสารเคมีกำจัดศัตรูพืชที่ถูกต้องควรทำ อย่างไร

- 1 เทสารเคมีกำจัดศัตรูพืชทั้งหมดในเครื่องพ่น แล้วเติมน้ำให้เต็ม
- 2 ผสมสารเคมีกำจัดศัตรูพืชทั้งหมดในภาชนะที่ใช้ผสมก่อน แล้วจึงเทใส่เครื่องพ่น
- 3 เทสารทั้งหมดใส่ในเครื่องพ่นที่มีน้ำอยู่แล้วยกเครื่องพ่นเขย่าให้สารเคมีละลายเข้า ด้วยกัน
- 4 ผสมสารเคมีกำจัดศัตรูพืชทั้งหมดในภาชนะที่ใช้ผสม แล้วจึงนำเครื่องพ่นมาต่อ

3.8 สารเคมีกำจัดศัตรูพืช ขณะฉีดพ่นออกไปแล้ว สารตกค้างอยู่ที่ใดบ้าง

- 1 สะสมในดิน ในน้ำ ในอากาศ และพืชที่ถูกฉีดพ่น
- 2 สะสมอยู่ในดิน ในน้ำ และในอากาศ เท่านั้น
- 3 สะสมอยู่ในพืชที่ถูกฉีดพ่นเท่านั้น
- 4 ไม่มีการสะสมในที่ใดๆ เลย

3.9 ขณะฉีดพ่นสารเคมีกำจัดศัตรูพืช การปฏิบัติตัวที่ถูกต้องควรทำอย่างไร

- 1 ใช้ผ้าปิดจมูก สวมถุงมือและเสื้อผ้ามิดชิด ใส่รองเท้าบู๊ต
- 2 สูบบุหรี่พ่นควันออกมาก ๆ เพื่อป้องกันสารสูดหายใจรับสารเคมีเข้าไป
- 3 ฉีดพ่นเหนือลม โดยไม่ต้องสวมใส่เครื่องป้องกันใดๆเลย
- 4 ฉีดพ่นได้โดยไม่ต้องสวมใส่เครื่องป้องกันใดๆเลย

3.10 หลังใช้สารเคมีกำจัดศัตรูพืช ควรปฏิบัติตนอย่างไร

- 1 ล้างภาชนะอุปกรณ์ในแม่น้ำ ลำคลองที่อยู่ใกล้ทันที
- 2 ล้างภาชนะด้วยผงซักฟอก อาบน้ำ สระผมเปลี่ยนเสื้อผ้าใหม่ทันที
- 3 อาบน้ำ ใส่เสื้อผ้าชุดเดิม ทำงานอื่นต่อไป
- 4 ใส่เสื้อผ้าชุดเดิม ทำงานอื่นต่อไป

3.11 สารเคมีกำจัดศัตรูพืช ที่เหลือจากการใช้แล้วควรเก็บอย่างไร

- ❍ 1 เก็บไว้ในห้องครัว
- ❍ 2 เก็บไว้ในตู้ยาสามัญประจำ บ้าน
- ❍ 3 เก็บไว้บริเวณที่เพาะปลูก
- ❍ 4 แยกเก็บใส่ตู้เก็บสารเคมีโดยเฉพาะ ปิดกุญแจ

3.12 กระป๋องหรือขวดหรือซองที่บรรจุสารเคมีกำจัดศัตรูพืช ที่ใช้หมดแล้วควรทำอย่างไร

- ❍ 1 นำไปเผาหรือฝัง
- ❍ 2 ทิ้งตามแม่น้ำลำคลองใกล้บริเวณเพาะปลูก
- ❍ 3 ล้างให้สะอาดแล้วเก็บไว้ใช้
- ❍ 4 ทิ้งถังขยะที่เทศบาลเตรียมไว้

3.13 ผู้ที่ได้รับพิษสารเคมีกำจัดศัตรูพืช สะสมนาน ๆ จะมีอาการอย่างไร

- ❍ 1 กระวนกระวาย คุ้มคลั่ง
- ❍ 2 ปวดท้อง หน้ามืด
- ❍ 3 เวียนศีรษะ หน้ามืด ตาลาย คอแห้ง
- ❍ 4 ไม่มีอาการใดๆเลย

3.14 การปฐมพยาบาลเบื้องต้น เมื่อถูกสารเคมีกำจัดศัตรูพืชหกรดเสื้อผ้าควรทำอย่างไรเป็นอันดับแรก

- ❍ 1 หายามารับประทาน
- ❍ 2 เปลี่ยนเสื้อผ้าที่เปรอะเปื้อนออกพร้อมอาบน้ำทันที
- ❍ 3 คลายเสื้อผ้าให้หลวม
- ❍ 4 ปล่อยให้เสื้อผ้าแห้งตามธรรมชาติ

3.15 การปฐมพยาบาลเบื้องต้น เมื่อดื่มหรือทานสารเคมีกำจัดศัตรูพืชเข้าไป ควรทำอย่างไร

- ❍ 1 เมื่อผู้ป่วยกินสารพิษเข้าไป ควรทำให้อาเจียน
- ❍ 2 ให้ผู้ป่วยรับประทานไข่ขาวดิบ
- ❍ 3 ให้ผู้ป่วยดื่มน้ำเกลืออุ่น (เกลือ 1 ช้อนโต๊ะ)
- ❍ 4 ปฏิบัติทุกข้อตามลำดับ

<u>ส่วนที่ 4</u> ทัศนคติและความเชื่อในการใช้สารกำจัดศัตรูพืช

ข้อ	ข้อคำถาม	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
4.1	สารเคมีกำจัดศัตรูพืชเข้าสู่ร่างกายคนเราได้โดยการกินเท่านั้น					
4.2	สารเคมีกำจัดศัตรูพืชเป็นอันตรายต่อแมลงที่เป็นศัตรูพืชเท่านั้น ไม่เป็นอันตรายต่อมนุษย์แต่อย่างไร					
4.3	การใช้สารเคมีกำจัดศัตรูพืชบ่อย ๆ ครั้งจะต้องเพิ่มปริมาณมากขึ้นเรื่อย ๆ ป้องกันการดื้อยา					
4.4	การผสมสารเคมีกำจัดศัตรูพืชหลาย ๆ ชนิด (มากกว่าคำแนะนำ ในฉลาก) เข้าด้วยกันทำ ให้การกำจัดศัตรูพืชได้ผลดียิ่งขึ้น และไม่มีผลเสียแต่อย่างไร					
4.5	การใช้ไม้คนสารเคมีกำจัดศัตรูพืช แทนการใช้มือทำให้ปลอดภัยจากการสัมผัสสารเคมี					
4.6	การผสมสารเคมีกำจัดศัตรูพืชในปริมาณที่มากกว่าที่ฉลากกำหนดทำให้ได้ผลผลิตพืชสูง					
4.7	ถ้าฉีดพ่นสารกำจัดศัตรูพืชเหนือทิศทางลมไม่ต้องใช้อุปกรณ์ป้องกัน					
4.8	สารเคมีกำจัดศัตรูพืชเป็นอันตรายต่อสิ่งมีชีวิตและสิ่งแวดล้อม					
4.9	เมื่อรู้สึกว่าได้รับสารเคมีกำจัดศัตรูพืช ควรดื่มน้ำมะพร้าวเพื่อขับพิษสารเคมีกำจัดศัตรูพืชออกจากร่างกาย					
4.10	ควรดื่มน้ำมาก ๆ หลังจากสัมผัสสารเคมีกำจัดศัตรูพืชเพื่อให้พิษของสารเคมีกำจัดศัตรูพืชหมดไปจากร่างกาย					
4.11	การออกกำลังกายเพื่อให้เหงื่อออกเป็นการขับพิษสารเคมีกำจัด					

ข้อ	ข้อคำถาม	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
	ศัตรูพืชออกจากร่างกาย					
4.12	ขณะพ่นสารเคมีกำจัดศัตรูพืชไม่ควรสวมเสื้อเพราะอึดอัด					
4.13	สารเคมีกำจัดศัตรูพืชสามารถตกค้างในผลผลิต และเป็นอันตรายต่อผู้บริโภค					
4.14	สารเคมีราคาแพงมีประสิทธิภาพในการกำจัดแมลงได้ดีกว่า					
4.15	หากฉีดพ่นสารเคมีกำจัดศัตรูพืชโดยไม่สวมอุปกรณ์ป้องกัน ต้องอาบน้ำทันทีหลังจากฉีดพ่นเป็นการป้องกันตัวอีกวิธีหนึ่ง					

<u>ส่วนที่ 5</u> การปฏิบัติตนในการใช้สารกำจัดศัตรูพืช

ระยะเวลาที่ใช้สารเคมี พ.ศ..... เดือน.....ถึงเดือน.....

ข้อ	ข้อคำถาม	ทำเป็นประจำ	ทำเป็นบางครั้ง	ทำน้อยครั้ง	ไม่ทำเลย
ก่อนฉีดพ่น					
5.1	ศึกษาชนิดของสารเคมีกำจัดศัตรูพืชให้เหมาะสมกับชนิดของศัตรูพืช				
5.2	เลือกใช้สารเคมีกำจัดศัตรูพืชตามคำแนะนำของเกษตรกรเพื่อนบ้าน/โฆษณาของบริษัท/ราคา				
5.3	อ่านฉลากคำแนะนำก่อนใช้ปฏิบัติตามคำแนะนำในฉลากทุกขั้นตอน				
5.4	ตรวจสอบเครื่องมือและอุปกรณ์ก่อนออกปฏิบัติงาน				
5.5	นำบุคคลที่ไม่เกี่ยวข้องและสัตว์เลี้ยงออกจากบริเวณที่จะพ่นสารเคมี				
5.6	สวมถุงมือและใช้ผ้าปิดปากขณะผสมสารเคมี				
5.7	สูดดมสารเคมีกำจัดศัตรูพืชเพื่อตรวจเช็คดูว่าเป็นของจริงหรือของปลอม				
5.8	ผสมสารเคมีด้วยมือ				
5.9	ผสมสารเคมีหลายๆชนิดเข้าด้วยกันเพื่อเพิ่มประสิทธิภาพในการกำจัดศัตรูพืช				
ขณะฉีดพ่น					
5.10	สวมเสื้อผ้าที่มิดชิดป้องกันสารเคมีขณะฉีดพ่นสารเคมี				
5.11	สวมรองเท้าบู๊ตขณะพ่นสารเคมี				

ข้อ	ข้อคำถาม	ทำเป็นประจำ	ทำเป็นบางครั้ง	ทำน้อยครั้ง	ไม่ทำเลย
5.12	สูบบุหรี่หรือดื่มน้ำ ขณะฉีดพ่นสารเคมี				
5.13	พ่นสารเคมีกำจัดศัตรูพืช ขณะลมแรง				
5.14	ยืนอยู่เหนือทิศทางลม ขณะพ่นสารเคมีไม่ใช่อุปกรณ์ป้องกัน				
หลังฉีดพ่น					
5.15	ล้างภาชนะบรรจุสารเคมีกำจัดศัตรูพืชในแหล่งน้ำ				
5.16	ทิ้งภาชนะบรรจุสารเคมีกำจัดศัตรูพืชลงในแหล่งน้ำ				
5.17	ล้างภาชนะด้วยผงซักฟอกก่อนเก็บ				
5.18	ถอดชุดที่สวมใส่ขณะพ่นสารเคมีทันทีหลังเสร็จงาน				
5.19	ซักชุดที่สวมใส่ขณะฉีดพ่นทันที หลังหลังเสร็จงาน				
5.20	เก็บสารเคมีในตู้สำหรับเก็บสารเคมี				
5.21	ภาชนะที่ใส่สารเคมีกำจัดศัตรูพืชที่ใช้หมดแล้วนำไปฝังหรือเผา				
5.22	ล้างมือและหน้าด้วยสบู่ก่อนรับประทานอาหาร				
5.23	อาบน้ำทันทีหลังฉีดพ่น				

APPENDIX B

SCHEDULE ACTIVITIES

Research Process	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Literature Review									
Developed Proposal									
Ethical consideration									
Data collection / Data Analysis									
Discussion									
Writing Report									
Thesis Defend									
Revision									
Submit Final Thesis									

APPENDIX C

ADMINISTRATION COST

NO	ACTIVITIES		PRICE (BAHT)	TOTAL PRICE (BAHT)
1.	Traveling Expenditure (Bangkok-Ubonratchathani)		6 x 5,500	33,000
2.	Pre-testing	- Photocopy questionnaires	1,000	1,000
		- Stationery	2,000	2,000
		- Miscellaneous Expenditure	3,000	3,000
		- Accommodations	2,000	2,000
3.	Data collection	- Photocopy questionnaires	3,000	3,000
		- Interviewers training	15,000	5,000
		- Interviewers per Diem	5 x10 x 200	10,000
		- Interviewees compensation	400 x 50	20,000
		- Miscellaneous Expenditure	1,500	1,500
		- Accommodations	2,000	2,000
4.	Document Printing			
		- Paper + Printing	3,000	3,000
		- Photocopy (exam + final submit)	2,000	2,000
		- Stationery	500	500
		- Binding Paper (exam)	800	800
		- Binding Paper (submit)	1,500	1,500
TOTAL				**90,300**

CURRICULUM VITAE

Name	: Ms. Saowanee Norkaew
Date of Birth	: 22nd July 1983
Place of Birth	: Ubonratchathani Province, Thailand
Educational Achievement	: Bachelor of Science (Agricultural Industry) King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand
Research Experience	: Physicochemical characteristics of Thai honeys