



# CHAPTER I

## INTRODUCTION

### 1.1 Background and Rationale

Thailand has continuously been developed in both agricultural and industrial sectors. At present, the country is remarkably successful in export-driven agriculture and manufacturing. The significant economic growth has positive as well as negative influences on the health of its people. On the positive side, the relative increase in average household income has, of course, been paralleled by the higher levels of education and thus of health concern among the Thais. On the negative side, inner-city areas are extremely crowded as a result of industrialization. Industrial wastes are often dumped into waterways, some of which are also used for domestic water causing unhealthy environment.

According to the Structure of Labor Force and Employment in Thailand in year 2543 (2000), 33.3 million people were in working age (53.5% of the total population of 62,609,100). Of this amount, 31.9 million were employed and 30.8 million (or 96.5% of those who were employed) were educated. 14.9 million people (or 46.8% of those employed), 8.7 million males and 6.2 million females, were in the agricultural sector. In Southern Thailand, the Structure of Labor Force and Employment showed that 4.21 million people were employed. Of this amount, 94.7% (or 3.99 million people) were educated and 54% were in the agricultural sector (National Statistical Office, 2000).

Unhygienic and inappropriate working environment may well have negative effects on health and safety of the employee. The problems could be divided into 2 categories: 1) illness and 2) accidents.

Since the First National Economic and Social Development Plan launched in 1961, industrialization has been encouraged. Meanwhile agriculture is well supported by the government. That has caused illness and accidents ever still.

Illness and risks from working in the agricultural sector generally occur from chemical practice, dust, working environment and accidents. The most common problems are from chemical which has been the major productive force for the last two decades. Chemical practice has been implemented for commercial farming with cash returns so that plant could become rather productive. Mono-cropping systems normally bring about serious plant pathology and pests, and end up with heavy reliance on chemical fertilizers, herbicides and insecticides. Given the resistance that pests have acquired over the years, recent increase in pesticide consumption is also substantial and worrisome.

Illness and risks from working in the agricultural sector in Thailand are as follows:

### **1.1.1 Pesticide**

In 1995, there were 132,478,570 rais of farm holding land in Thailand. Most of the area (68,292,753 rais or 51.6%) were paddy land. The rest were field crops (32,011,185 rais or 24.2%), fruit trees and tree crops (22,318,991 rais or 16.9%), housing area (3,518,683 rais or 2.7%), idle land (3,221,465 rais or 2.4%) and others (1,396,619 rais or 1.1%). In the South, there were 18,164,960 rais of farm

holding land (13.7% of total in Thailand). They were fruit trees and tree crops (13,411,814 rais or 73.8%), paddy land (3,382,768 rais or 18.6%), housing area (507,949 rais or 0.4%), idle land (392,663 rais or 0.3%) and others (240,136 rais or 0.2%). In Krabi Province, there were 1,164,083 rais of farm holding land (6.4% of total in the South). They were fruit trees and tree crops (1,031,975 rais or 88.7%), paddy land (75,858 rais or 6.5%), housing area (21,225 rais or 1.8%), idle space (19,879 rais or 1.7%) and others (5,716 rais (0.5%).

In 2000, Thailand imported 33.6 kilotons of pesticides or approximately 4,185.6 million baht via the Bangkok Port. Most were herbicides weighing 16.4 kilotons and costing 2,169.9 million baht. Then came insecticides at 9.6 kilotons or 1,149.6 million baht, and fungicides at 4.9 kilotons or 594.7 million baht. The top-3 imported herbicides, valued in Thai baht, were Glyphosate Isopropylamind Salt, Bromacil and Paraquat Dichloride, respectively. The top-3 imported insecticides were Endosulfan, Cypermetrin and Methamidophos, respectively. The top-3 imported fungicides were Carbendazim, Metalaxyl and Propinab, respectively. From 1996 through 2000, it is not clear whether the quantity or value of imports of these pesticides changed appreciably. At the same time imports of plant growth retardants (PGRs) and fumigants definitely increased.

Researchers have found that the most pesticide-intensive plants are rice, tropical fruit, such as orange, sugarcane, vegetable, cassava, para rubber, cotton, soybean, tobacco and chilli, respectively. The most insecticide-intensive plants are rice, tropical fruit, cassava, cotton, vegetable and chilli, respectively. The most herbicide-intensive plants are rice, sugarcane, para rubber, cassava, tropical fruit, palm oil and pineapple, respectively.

## **1.1.2 Impact of Chemical Substances Used in Agriculture on Humans and Environment**

### *Hazard to Health*

Currently, there are approximately 14.9 million workers in Thailand's agricultural sector. In 2000, these workers were more likely to be poisoned by pesticides than workers in other sectors. According to the Epidemiological Surveillance Report (๕๓. 506) by the Department of Epidemiology, there were 4,337 patients getting ill from their occupation in year 2000. Most (3,109 cases or 71.68%) were poisoned by pesticides. Meanwhile, the 2001 Fiscal Year Report by the Department of Sanitation stated that the sick ratio was 15.43:100,000 and the cases of death were 21. In Krabi Province, there were 2 patients poisoned by pesticides.

Due to a variety of pesticides available and ineffective government control, they are traded and used inappropriately. In addition, lack of awareness of their toxicity, and of self-prevention methods among agriculturists, has led to pesticide-linked work accidents. These chemicals may harm an individual as well as other living organism, directly or indirectly. The chemicals employed could also pollute the environment and contaminate the food chain causing both acute and chronic illnesses.

### **1.1.3 Accidents from Working in Agricultural Sector**

Besides illness arisen from chemical practice, agriculturists may have an accident from farm machinery. The farm machinery is predominantly used for pre-planting and partially used for planting and harvesting. However, the trend for usage is increasing due to the shortage of workers. Dangers of farm machinery are often

developed from noise which has impact on hearing, from vibration which affects myalgia, tendinitis, bone-algia, and from sharp tools or spinning motor. There is no record for the exact number of such accidents partly because they are not covered by the Workmen's Compensation Fund. However the farm machinery is increasingly a reason for accidents from work.

#### **1.1.4 Agricultural and pesticide situation in Tambon Krabinoi**

According to the food examining result of 10 food markets in municipal Krabi (E-inspection), year 2003-2004 by the Consumer Protection Group, Krabi Provincial Health Office, there was pesticide remaining in vegetables sold. Some of these vegetables and fruits were from Tambon Krabinoi which included 13 villages of 6,875 rais (Amphur Mueang Krabi Agricultural Office, 2002). Most of its local people worked in agricultural sector, especially vegetable and fruit plantation which cover about 54,980 rais. Accordingly, Krabinoi is known as the major provider of vegetable and fruit in Amphur Meuang Krabi. The agriculturists in this area could earn a great deal from watermelon, rambutan, leusium domesticum, pomelo, durian, mangosteen etc. For one reason, Krabinoi is located in lowlands. There are several rivers and canals flowing across the area so that the water supply is available all year. The soil is greatly naturally fertilized. Also Krabinoi is quite near an agricultural market. Transportation is convenient. Moreover, it is not far from downtown. In general, many are growing vegetable and fruit: some do full time, some do part time, some are major producers and some are minor. Plantation system has shift from producing for consumption within household to cash crops. Therefore pesticides have become more widely used among agriculturists in Krabinoi. Inadequately, this

problem has not been taken into any government agencies' consideration seriously. I'm foresee risk of multiple health problems of the agriculturists and consumers, that might happen in the near future. In addition to the health problems for which the research is accountable, the more recent increase in pesticide consumption might well trouble the economics of Krabinoi people as well as the environment. The researcher is specifically interested to study the factors that effected to healthy of agriculturists. The ultimate goal of this research is to assist in reducing risk due to pesticide residue building up in food crops. Agriculturists in Krabinoi are randomly chosen for the sample.

## **1.2 Research Question**

### **Primary Research Question**

1. What is the relation between Pesticide usage with symptoms in Krabinoi?

### **Secondary Research Question**

1. Are symptoms prevalence rates different in agriculturists who have different levels of exposure to insecticides in Tambon Krabinoi?
2. What factors other than pesticide use influence symptom rates?
3. What factors influence pesticide usage in tambon Krabinoi?
4. What are the relationships of knowledge, attitude and practice about insecticide use in Krabinoi?

### **1.3 Research Objective**

#### **General Objectives**

1. To study about pesticide usage and symptoms of agriculturists in Tambon Krabinoi Amphur Mueang Krabi Province.

#### **Specific Objectives**

1. To compare the different in symptoms between agriculturists who use pesticides and those who do not use pesticides in Tambon Krabinoi Amphur Mueang Krabi Province.
2. To compare the different in other factors between agriculturists who use pesticides and those who do not use pesticides.

### **1.4 Research Hypothesis**

1. In Tambon Krabinoi, symptom rates are higher in agriculturists with higher insecticide exposure than in those with lower exposure.
2. High knowledge about pesticides usage is related to symptoms and pesticide used practice in agriculturists in Tambon Krabinoi Amphur Mueang Krabi Province.
3. Attitude in pesticides usage is related to symptoms and pesticide use practice in agriculturists in Tambon Krabinoi Amphur Mueang Krabi Province.
4. Practice in pesticides usage is related to symptoms of agriculturists in Tambon Krabinoi Amphur Mueang Krabi Province.

5. Other subject characteristics, such as age, sex and specific agricultural occupation, influence symptoms of agriculturists in Tambon Krabinoi Amphur Mueang Krabi Province.

### 1.5 Conceptual Framework

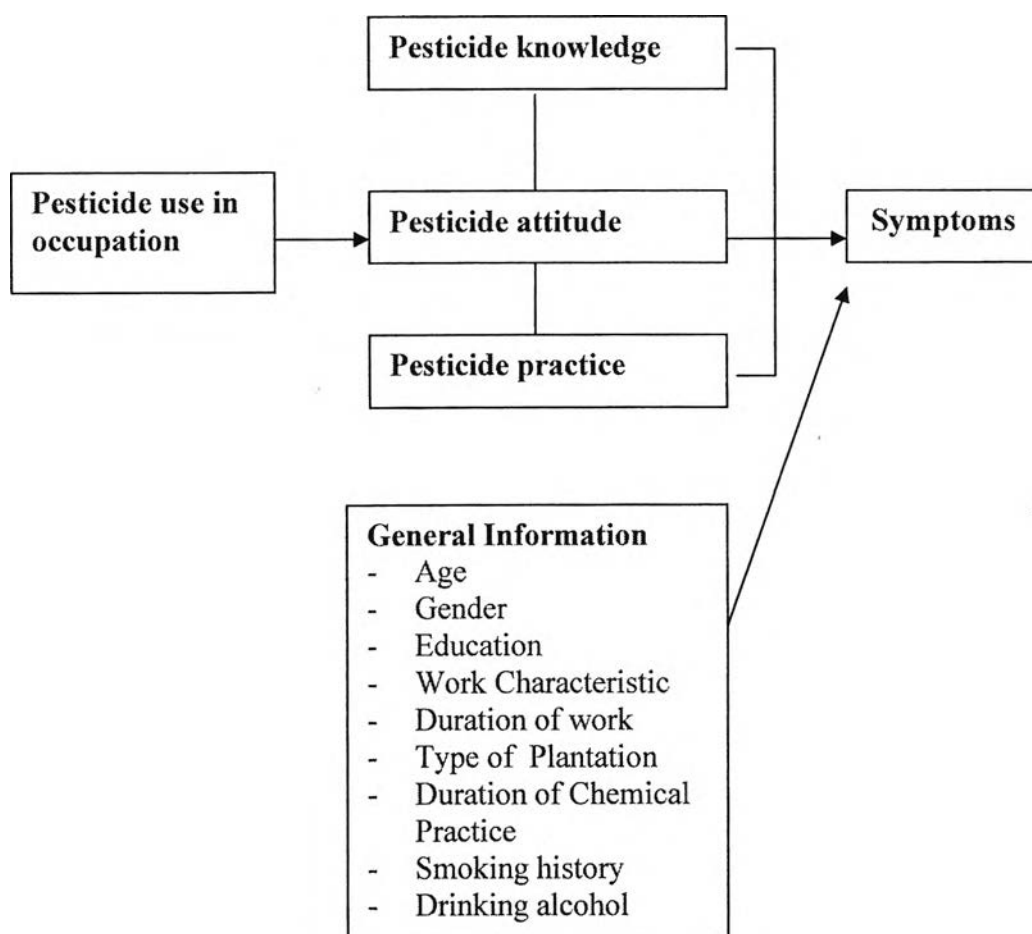


Figure 1: Conceptual framework



## 1.6 Variable to be study

**Independent Variable** are agriculturists who use and do not use pesticide, gender, age, education, work characteristic, pesticide exposure level, duration of work, type of plantation, duration of chemical usage, knowledge, attitude, behavior in pesticides usage, smoking history and drinking alcohol.

**Dependent Variable** are symptoms.

### 1.6.1 Operational Definitions

**Cholinesterase** is an enzyme to digest Acetylcholine compounds (If there is high level will affect to nerve impulse, muscular stimulative, paralysis and die).

**Pesticides** are Organophosphate and Carbamate Insecticides excluding Herbicides and Fungicides.

**Agriculturists who use pesticides** are Agriculturists in Tambon Krabinoi Amphur Maung Krabi Province. They are 13 villagers who plant Coffee, Rice, Leusium domesticum, Rambutan, Durian, Mangosteen, Pomelo, Vegetable, Mixed farming and Orchard, both owner includes their family and employee who do plantation and chemical sprayer in field.

**Agriculturists who do not use pesticides** are Agriculturists in Tambon Krabinoi Amphur Maung Krabi Province. They are 13 villagers who plant Para Rubber, Oil Palm and Coconut, both owner includes their family and employee who do plantation.

**Toxin symptoms** are agriculturist who had been headache, weakness/lack of energy, trembling, twitching muscles, been soaked with sweat, stomach ache, diarrhea, feel nauseous or vomiting, blurred or dim vision, difficulty breathing, itchy

eyes/ scratchy eyes/ eye irritation, rash, numbness in arms or legs, saliva/ runny nose/ tears comes down, numbness of tongue, wheezing after spraying pesticide.

**Health effect** mean agriculturist who had toxin symptoms.

### **1.7 Expected outcome and benefits**

1. Perceive pesticides toxicity situation of agriculturists in this area.
2. Use its result to develop and solve their problems in pesticides usage and disease from their occupation.
3. To be basic for advance research and study.