CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This research aimed to ascertain relationships of general information, pesticide use in occupation: pesticide knowledge, pesticide attitude, pesticide practice and other factors (independent variables) with pesticide-related symptoms (dependent variables) among agriculturists in Tambon Krabinoi Amphur Mueang Krabi Province. The subjects consisted of 262 agriculturists (included 134 agriculturists who did not use pesticides and 128 agriculturists who used or contacted pesticides) in Tambon Krabinoi Amphur Mueang Krabi Province. Face to face interviewers were conducted to collect data by the researcher and 5 research assistants during July 2007, using standardized, pre-tested questionnaires. The data were described in mean, frequency, percentage and standard deviation. Chi-square statistics, T- test and Mann-Whitney U test were calculated to test for relationship between independent and dependent variables. The main results of this study may be summarized as follow:

General information, proportion of male subjects (55.7%) was slightly higher than that of female subjects, 85.5% were older than 34 years of age and average age was 47.19 years old, 52.3% had education level at pratom grade 4. Most of agriculturists (91.6%) cultivated crops by themselves, and 69.8% growing Para Rubber, and 57.6% had done agriculture less than 15 years.

Most of agriculturists who use pesticide (75.0%) have been using pesticide less than 5 years, and 57.8% often use pesticide 1 – 3 times a year, 66.4% dissolved pesticide in water not above 50 c.c. per rai on average, 73.4% usually spray pesticide before 8.00 am., and most of them (43.8%) had most recently used or contacted pesticide 31 – 60 days ago. Most of them (94.3%) used chemical fertilizer, and 80.5% used herbicide in their garden. Most (59.9%) used mosquito coils. Pesticide knowledge, 66.4 % of agriculturists knowledge was in good level (10 – 12 point), the average point was 9.72 point. Attitude in pesticide practice of agriculturists, 69.1% were in average level of attitude (37 – 47 point), the average point was 44.18 point. Practice in pesticide use of agriculturists, 78.9% were in good level of practice (more than 104 points), the average score was 109.44 points from 130 points.

A total of 16 symptoms were considered as dependent variables, most (45.3%) were rash that agriculturists have ever been. The symptoms that subjects had during using were been soaked with sweat (27.3%), major symptoms had been shortly after using pesticide were rash (43.0%), major symptoms that they had persisting after using were been soaked with sweat (10.9%). There were 10 symptoms had small numbers of subjects, these were categorized into 3 groups by organ system: digestive symptoms (stomach ache, diarrhea and feel nauseous or vomiting), respiratory symptoms (difficulty breathing and wheezing) and neuromuscular symptoms (twitching muscles, blurred or dim vision, trembling, numbness in arms or legs and numbness of tongue).

Knowledge in pesticide usage had no significant relationship with pesticide attitude of agriculturists ($p = 0.182$) and knowledge in pesticide practice had no significant relationship with practice in pesticide use of agriculturists ($p = 0.246$).

Attitude in pesticide practice of agriculturists had significant relationship with practice in pesticide use ($p = 0.004$).

Age had no significant relationship with pesticide related symptoms. Gender had significant relationship with been soaked with sweat ($p < 0.001$) that occurred in male more than female it might be that most agriculturists who had done and more contact with pesticides were male. There was no consistent association of knowledge in pesticide practice, attitude in pesticide practice and practice in pesticide use of agriculturists with gender. Education level had significant relationship with knowledge in pesticide practice of agriculturists ($p = 0.013$). There was no consistent association of education level with attitude in pesticide practice of agriculturists and practice in pesticide use. Education level had no significant relationship with pesticide related symptoms. Work characteristic had significant relationship between pesticide-related symptoms. In the term of agriculturists who cultivated crops by themselves had significant relationship with symptoms including rash ($p = 0.006$). Agriculturists that hired other person had significant relationship with symptoms including itchy eyes/scratchy eyes/eye irritation ($p = 0.012$). Agriculturists that been an employee in agricultural sector had significant relationship with symptoms including been soaked with sweat ($p = 0.009$), itchy eyes/scratchy eyes/eye irritation ($p = 0.004$). Agriculturists that been an employee but not in agricultural sector had significant relationship with symptoms including Digestive symptoms ($p = 0.017$), and itchy eyes/scratchy eyes/eye irritation ($p = 0.014$).

Most subjects were who had done agriculture more than 15 years. The amount year that done agriculture had significant relationship with headache ($p = 0.033$) and weakness/lack of energy ($p = 0.016$). Type of plantation had significant relationship

between pesticide-related symptoms. In the term of plantation had significant relationship with symptoms including headache ($p = 0.010$) and rash ($p = 0.034$). There was no consistent association of paddy field, oil palm, farm, para rubber and no type of plantation with symptoms. Duration of chemical practice including agriculturists who do not use pesticides, go into pesticide area but not spray-mix, who mix or spray only one and who had done both of spray and mix type had significant relationship between pesticide-related symptoms including weakness/lack of energy ($p = 0.002$), weakness/lack of energy shortly after using pesticides ($p = 0.050$), been soaked with sweat ($p = 0.001$), itchy eyes/scratchy eyes/eye irritation ($p = 0.004$), itchy eyes/scratchy eyes/eye irritation shortly after using pesticides ($p = 0.002$), rash ($p = 0.006$), rash shortly after using pesticides ($p = 0.002$), saliva/runny nose/tears comes down ($p = 0.005$) and saliva/runny nose/tears comes down shortly after using ($p = 0.013$).

The highest percentage of good level in knowledge of pesticide usage was agriculturists who spraying and mixing pesticides. Duration of chemical practice including agriculturists who do not use pesticides, sprayer, mixer and agriculturists that go into pesticide area but not spray and/or mix pesticides had no relationship with knowledge of pesticide usage. Most subjects in duration of chemical practice that including agriculturists who do not use pesticides, sprayer, mixer and agriculturists that go into pesticide area but not spray and/or mix pesticides were in average level of attitude in pesticide use. Duration of chemical practice had significant relationship with attitude in pesticide usage ($p = 0.010$). Most of subjects had points in good level of practice in pesticide use. Duration of chemical practice including agriculturists who do not use pesticides, sprayer, mixer and agriculturists that go into pesticide area but

not spray and/or mix pesticides had no relationship with practice in pesticide use. The symptom prevalence was generally directly associated with amount year using pesticides. Subjects who had long using pesticides had more symptoms than using pesticides a few years, and the amount year that using pesticides had significant relationship with symptoms including headache ($p = 0.004$) and weakness/lack of energy ($p = 0.001$). The percentage of symptoms was high when frequency of using pesticide a year was high, and times using pesticide a year had significant relationship with symptoms including headache ($p = 0.007$), been soaked with sweat ($p=0.001$), itchy eyes/scratchy eyes/eye irritation ($p < 0.001$) and rash ($p = 0.009$). Mixing pesticides for spray and time that subjects usually sprayed pesticides had no significant relationship with symptoms. The highest percentage of symptoms that found in the latest time used and/or contacted pesticides was in the range of 1 – 30 days ago. The latest time that used and/or contacted pesticides had significant relationship with symptoms including headache ($p = 0.039$), itchy eyes/ scratchy eyes/ eye irritation ($p = 0.030$), rash ($p = 0.018$). Time of drinking alcoholic on average had significant relationship with symptoms including been soaked with sweat ($p = 0.001$). History of smoking cigarettes had no significant relationship with symptoms. Using mosquito coils had significant relationship with symptoms including rash ($p = 0.011$) but used household pesticide spray had no significant relationship with symptoms. Have to improve level to average level in knowledge of pesticide practice was associated with higher symptoms than good level in knowledge, knowledge level had significant relationship with symptoms including neuromuscular symptoms ($p = 0.003$). Attitude in pesticide practice had no significant relationship with symptoms. Practice in pesticide use had significant relationship with symptoms including Itchy

eyes / scratchy eyes / eye irritation ($p = 0.017$). Pesticide usage agriculturists and agriculturists not used had association with pesticide attitude ($p = 0.002$) but was not associated with pesticide knowledge.

5.2 Discussion of the results

Knowledge in pesticide usage had no association with pesticide attitude of agriculturists and practice in pesticide use of agriculturists. Practice in pesticide use had association with attitude in pesticide practice of agriculturists. It might be that behavior is controlled by attitude, only knowledge that they had learned or theirs experience can not make a decision doing something.

Although age had no association with symptoms but it tendency to higher age had highest symptoms it might be that young agriculturists be healthy than older or older agriculturists had long contacted with pesticides than younger. Gender had significant relationship with been soaked with sweat that occurred in male more than female it might be that most agriculturists who had done and more contact with pesticides were male. Gender had no association with knowledge in pesticide practice, attitude in pesticide practice and practice in pesticide use. Education level had association with knowledge in pesticide practice of agriculturists but had no association with attitude in pesticide practice and practice in pesticide use in accordance with the study of Thepsiri (1997) that education had related to knowledge and attitude but not related to practice, duration in usage had related to knowledge and attitude but not related to practice.

Work characteristic had significant relationship between pesticide-related symptoms. In the term of agriculturists who cultivated crops by themselves had

significant relationship with symptoms including rash (p = 0.006). Agriculturists that hired other person had significant relationship with symptoms including itchy eyes/scratchy eyes/eye irritation (p = 0.012). Agriculturists that been an employee in agricultural sector had significant relationship with symptoms including been soaked with sweat (p = 0.009), itchy eyes/scratchy eyes/eye irritation (p = 0.004). Agriculturists that been an employee but not in agricultural sector had significant relationship with symptoms including Digestive symptoms (p = 0.017), and itchy eyes/scratchy eyes/eye irritation (p = 0.014). It might be that subjects had one or more kind in work characteristic that contact with pesticide it should be risk-taking pesticide-related symptoms.

Duration of years that had done agriculture, most subjects were who had done agriculture more than 15 years and the amount year that done agriculture had association with symptoms it might be that more years that had done agriculture can get more contact with pesticides and more having pesticide-related symptoms.

Type of plantation had significant relationship between pesticide-related symptoms. In the term of plantation had significant relationship with symptoms including headache (p = 0.010) and rash (p = 0.034). There was no consistent association of paddy field, oil palm, farm, para rubber and no type of plantation with symptoms. It might be that plantation agriculturists had more contact pesticide than paddy field, farm, oil palm and no type of plantation.

Duration of chemical practice including agriculturists who do not use pesticides, go into pesticide area but not spray-mix, who mix or spray only one and who had done both of spray and mix type had significant relationship between pesticide-related symptoms including weakness/lack of energy (p = 0.002),

weakness/lack of energy shortly after using pesticides (p = 0.050), been soaked with sweat (p = 0.001), itchy eyes/scratchy eyes/eye irritation (p = 0.004), itchy eyes/scratchy eyes/eye irritation shortly after using pesticides (p = 0.002), rash (p = 0.006), rash shortly after using pesticides (p = 0.002), saliva/runny nose/tears comes down (p = 0.005) and saliva/runny nose/tears comes down shortly after using (p = 0.013). Agriculturists who had done both spraying and mixing risk to having pesticide related symptoms than others. The highest percentage of good level in knowledge of pesticide usage was agriculturists who spraying and mixing pesticides. Duration of chemical practice including agriculturists who do not use pesticides, sprayer, mixer and agriculturists that go into pesticide area but not spray and/or mix pesticides had no relationship with knowledge of pesticide usage. It might be that sprayer and mixer had more contact with pesticide than others, so they took more interest in safe use pesticides. Agriculturists do not use pesticide had association with attitude in pesticide usage (p=0.006). Most subjects in duration of chemical practice that including who do not use pesticides, sprayer, mixer and agriculturists that go into pesticide area but not spray and/or mix pesticides were in average level of attitude in pesticide use in accordance with the study of Boonnark (1999) that knowledge and behavior of agriculturists in insecticides and pesticides usage is in medium level.

The symptom prevalence was generally directly associated with duration of using pesticides. Subjects who had long using pesticides had more symptoms than using pesticides a few years, and the amount year that using pesticides had association with symptoms. The percentage of symptoms was high when frequency of using pesticide a year was high, and times using pesticide a year had association with symptoms. Agriculturists who mixed pesticide more had higher symptoms rates than

lower mixed. Mixing pesticides for spray had no association with symptoms. Time that subjects usually sprayed pesticides had no association with symptoms. The highest percentage of symptoms that found in the latest time used and/or contacted pesticides was in the range of 1 – 30 days ago. The latest time that used and/or contacted pesticides had association with symptoms in accordance with Yassin et al., (2002), Boonnark (1999), Sripak et al. (1990), Farahat et al. (2003) and Thepsiri (1997) that the pesticide-related symptoms was dependent on time and frequency of using pesticide a year.

Time of drinking alcoholic on average had association with symptoms it might be that risk behaviors in agriculturists who used or contacted with pesticides was factor that had effective to pesticide-related symptoms in agriculturists. Smoking cigarettes had no significant relationship with symptoms. Agriculturists who used mosquito coils had significant relationship with symptoms including rash ($p = 0.011$) but who used household pesticide spray had no significant relationship with symptoms. It might be that subjects used pesticide spray more carefully and less frequently than they used mosquito coils.

Unlike the present study, knowledge in pesticide practice and practice in pesticide use had association with symptoms in accordance with the study of Yassin et al., (2002), Ohayo-Mitoko et al., (2000), Nu-sorn & Songwut (1997), Thepsiri (1997), Natapin et al., (1995), Sripak et al., (1990) that Knowledge and practice in pesticide usage had association with pesticide-related symptoms.

Pesticide usage agriculturists and agriculturists not used had association with pesticide attitude ($p = 0.002$) but not association with pesticide knowledge. This suggests that at least sometimes, attitude can have a more important influence on

behavior than knowledge. Perhaps a positive attitude reinforces knowledge by helping people to think more carefully before acting.

5.3 Limitations of the study

This study did not evaluate all type of pesticide and health effects. Also, the study was done only in Tambon Krabinoi Amphur Mueang Krabi Province, so it might not be representative of whole province, or of larger geographic area such as Thailand itself.

5.4 Recommendations

This researcher would like to recommend the application of research results as follows:

Recommendation research results

1. The research found that knowledge in pesticide usage had no association with practice in pesticide use of agriculturists and attitude in pesticide practice of agriculturists, practice in pesticide use had strong association with attitude in pesticide practice of agriculturists. Education level had association with knowledge in pesticide usage but not association with attitude in pesticide practice and practice in pesticide use in agriculturists. Thus, the occupational health and health promotion authorities should be concerned in attitude moreover knowledge to reduce toxicity in chemical usage and improve pesticide management program.

2. This study found that agriculturists had more one type of plantations a persons, used pesticides many times per year and long using pesticides had been at risk in pesticide-related symptoms, the health officers and related officers should

promote the health information, check up and collect information of agriculturists correctly for planning.

3. The study found that general information such as gender, work characteristic, type of plantation and duration of chemical practice had association with pesticide-related symptoms the health officers and the related officers should co-operation with other while choosing intervention programs.

4. From this study the researcher recommend that plan or health promotion program for chemical usage and pesticide management program should be inserted media or instrument such as broadcast on radio or television that encouraged the agriculturists understand and perceive hazard of pesticides usage for their health, environment and consumers, continuously.

Recommendations for further study

1. These result suggest that there is a burden that persist after pesticides used. This is the first study to report this is Krabi. Further research is need to characterize and ascertain risk factors for pesticide-related symptoms and to develop method to decrease this burden.

2. Future research should study in other method such as case control study and cohort study to find out toxicity scale compare with level of cholinesterase in red blood cell and lymph to indicate hazard classification.

3. Seek further understanding why knowledge in pesticide usage is not associated with practice in pesticide use and what factors that effect to attitude in pesticide usage.