Environmental Awareness and Cholinesterase Level of Farmers

Prakai Wiboonwipa[1]
Nongnapas Thiengkamol[2]
Tanarat Khoowaranyoo Thiengkamol[3]

Abstract

The purpose of this research was to develop model of environmental awareness factors affecting cholinesterase level of agriculturist in Yasothon Province by a survey research and the questionnaire used for data collection from the population of agriculturists in year of 2014. Multi-stage random sampling was employed for sampling sample group of 389 agriculturists from population of 70,546 agriculturist. Structural Equation model (SEM) was used for model verification covering knowledge of pesticide use, knowledge of primary health care, psychological trait, psychological state, environmental education, inspiration of public mind for environmental conservation, and environmental conservation behavior. Research results illustrated that the psychological trait (PST), psychological state (PsS), inspiration of public mind for environmental conservation (INS), environmental education (EE), environmental conservation behavior (BEH), knowledge of primary health care (HK), and knowledge of pesticide use (Kno) affected on cholinesterase level with value of 0.95, 0.92, , 0.88, 0.87, 0.81, 0.77, and 0.76 respectively.

Keywords: Rice, model, environmental awareness factors, cholinesterase level, agriculturalist

[1]Ph.D. Candidate, Ph.D. Program in Environmental Education Mahasarakham University
Mahasarakham University
E-mail: prakai.w@nhso.go.th
[2]Advisor, Mahasarakham University
Mahasarakham University
E-mail: prakai.w@nhso.go.tho.go.th
[3]Co-Advisor, Director of Research In Motion Co., Ltd.
Mahasarakham University
E-mail: prakai.w@nhso.go.th

Introduction

Regarding to United States law, a pesticide is also any substance or mixture of substances that is determined to use as a plant controller or regulator for preventing disease (U.S. Environmental Protection Agency, 2013). Presently, pesticide chemical substance has impacted to the farmers across the world including developed countries, developing countries and least developed countries. It has direct and indirect effects to natural environment, and human health that cover user and exposers. The scale of impact relates to the types and quantity of pesticide. However, the health risk often occurs in developing and least developed countries. The chemical substance has been highly utilized are herbicide chemical substance; the insecticide, fungicide, and plant prevention disease chemical are subsequent (Issa et al., 2010; Siripanich et al., 2011; Thiengkamol, 2009c; World Health Organization, 2006).

Expert committee of Pesticides Utilization of WHO evaluated that there were 500,000 people got poison from pesticide overall the world and had mortality rate with 1-10 percents. This depends on the situation of treatment. However, the data might be lower than the real situation since the data firstly collected from only 19 developed countries but not agricultural countries. Majority agricultural countries are developing countries and the least developed countries do not have data recording system of patient or impact of chemical use. Afterward, WHO tried to collect and analysis, therefore it was found that almost 99.00 percentages of patients were died due to pesticide poison were in agricultural countries and they are developing and least developed countries. For this reason, it was named for acute poison of pesticide as "New third world's disease" (Ramathibodi Poison Center, 2012; Charoensong et al., 2011; Siripanich et al., 2011). As report mentioned above, Asia Continent, the peoples were got acute poison highest with 44.3 percents, America Continent with 42.6 percents, Europe Continent with 10.0 percents, Africa Continent with 2.8 percents, Australia and Oceania with 0.3 percents. It is obviously seen that Europe Continent was the first continent that has utilized pesticide but the mainstream of poisoning is happening in Asia Continent and America Continent. The group of pesticides are the origin of poison are chemical of organochlorines with 12.6 percents, arsenic with 6.1 percents, organophosphates with 3.4 percents, and zinc phosphide with 0.9 percents respectively (Bureau of Occupational and Environmental Diseases, 2009). In 2000, International Labour Organization reported that each year, the patient with acute poisoning from pesticide up to 1.1 million over the world. Moreover, amount of two thousands cases receiving poison unintentionally and when every cause was counted, it was revealed that the amount of patient with acute poisoning from pesticide up to 2.9 million over the world and with death of patient for 220,000 cases per year (Tungkijthavorn, 2006). The signs and symptoms of pesticide poisoning depend upon the pesticide involved and the type and magnitude of exposure. In general the signs and symptoms are dermal and ocular irritation (or allergic response), upper and lower respiratory tract irritation, allergic responses and asthma, gastrointestinal symptoms: usually vomiting, diarrhoea and abdominal pain, neurological symptoms: excitatory signs in the case of exposure to organochlorines, lethargy and coma; also polyneuritis. The specific syndromes includes cholinergic crisis (organophosphorus pesticides), bleeding (warfarin-based rodenticides), and caustic lesions and pulmonary fibrosis (paraquat) (WHO, 2006).

In Thailand for agricultural sector, the quantity of pesticide use has increased, it might due to numerous reasons such as knowledge insufficiency, lack of environmental awareness and law enforcement. Moreover, the convenient

access because it's cheap price when compared to other countries due to without plus cost of environmental damage and environmental impact. The import of pesticide for agricultural sector of Thailand since B.E. 2545-2552, it has gradually more imported three times from 39,634 tons to be 118,152 tons when calculate to be money with 9,116 million bahts to 16,816 million bahts. The common of 50 percentages are herbicide, insecticide, fungicide and others respectively (The Agricultural Bureau, 2010). The results of increased amount of chemical substance pointed out that the rate of chemical use is growing, consequently it would be directly and indirectly origin of impacts to environment, ecosystem and health.

The basic concept of environmental education is pertinent to sustainable development that covers to consider to 3 pillars of economic, social and environment. Global peoples have responsibilities to our and future generations to conserve the environment for better quality of life for our and next generations. Therefore, it needs to formulate the critical policy and plan to attain the goals of environmental education of fostering clear awareness of, and concerning about economic, social, political and ecological interdependence in urban and rural areas. Consequently, providing opportunities for all to acquire the knowledge, values, attitudes, commitment and skills, the protection and improvement of the environment are included. Creating new patterns of behavior for all groups in society, the environment with public mind and responsibility are considered (UNESCO, 1978; Thiengkamol, 2011e; Thiengkamol, 2011i; Thiengkamol, 2012e; Thiengkamol, 2012f; Thiengkamol, 2012h).

Thus, Thiengkamol and her colleagues have researched (2012-2013) on public consciousness or public mind based on inspiration from insight and inspiration is different from motivation because inspiration needs no rewards. Inspiration of public consciousness or public mind, especially, for natural resources and environment conservation, one doesn't receive any reward, admiration or complement for ones act for natural resources and environment conservation. Inspiration on might occur due to appreciation in a person as role model or idle, events, situations, environment, media perceived such movies, book, magazine, and internet. (Chomputawat et al., 2013b; Kotchakote et al., 2013b; Morrasri et al., 2012b; Saisunantharom et al., 2013b; Thiengkamol, 2012e; Thiengkamol, 2012h; Thiengkamol, 2012i).

Cholinesterase enzyme is discovered in all living creatures including humans, animals, and insects. This essential enzyme is working for the nervous system. The different functions take palace in human and insect nerve transmission. The human body and other animals, contain electrical switching centers called 'synapses'. The body produces a chemical called 'acetylcholine' which transforms to enzyme called 'acetylcholinesterase' which breaks down the acetylcholine and turns off the switches and its process occurs very quickly. The brain signals inform throughout the body by controlling respiration, acting muscle, digestion, and other life functions (Harrington, 2002; Katzung, 2001; Pohanka, 2011; Tougu, 2001; Tripathi, 2008).
Pesticide is chemical which is able to throw nervous system out of balance by functioning as cholinesterase inhibitor and it interferes nervous function. Repeated and unchecked firing of electrical signals causes uncontrolled and rapid twitching of muscles, paralyzed breathing, convulsions, and fatality for extreme cases (Harrington, 2002; Katzung, 2001; Pohanka, 2011; Tougu, 2001; Tripathi, 2008).

Yasothon Province is an agricultural area of different farming. Thus this area has heavily pesticide use. Monitoring the cholinesterase level of agriculturists, it can identify the exposure of pesticide and health risk. Moreover, it can use the

data for planning primary health care and environmental management for decreasing and preventing the mortality rate of people. Thus, the agricultural activity should be systemically organized with collaboration among ministry of Ministry of Public Health, Ministry of Agriculture and Cooperative, Ministry of Environment and Natural Resources, Ministry of Information and Communication Technology, and Ministry of Science and Technology to formulate the policy and plan to holistically implement for saving agriculturist and general people health and to protect environment and ecosystem for present and next generation to meet a better quality of life. Understanding, the environmental awareness factors of cholinesterase, it would encourage, promote and support farmers and people to aware of environmental conservation and health promotion, particularly, farmer in Yasothon Province and other provinces in the northeastern region of Thailand to aware for avoiding to contact pesticide. Moreover, understanding the predicted factors of psychological trait (PST), psychological state (PsS), environmental conservation inspiration (INS), environmental education (EE), environmental conservation behavior (BEH), knowledge of primary health care (HK), and knowledge of pesticide use (Kno), can use and apply to train the farmers to increase to manipulate and avoid from pesticide toxics effectively.

Research objective

The objective was to develop the model of environmental awareness factors affecting cholinesterase level of agriculturists in Yasothon Province with factors covering knowledge of pesticide use, knowledge of primary health care, psychological trait, psychological state, environmental education, environmental conservation inspiration, and environmental conservation behavior.

Methodology

1. Population and Sample

Population was 70,546 agriculturists in Yasothon of Northeastern region of Thailand. Sample was 400 agriculturists that collected with Multi-stage random sampling technique by sampling through district and sub-district.

2. Research instrument

The content and structural validity were determined by Item Objective Congruent (IOC) with 5 experts in the aspects of pesticide, environmental education, psychology, social science and social research methodology. The reliability was tried out by conducting with the sample group from 40 agriculturist lived adjacent province. The reliability was determined by Cronbach's Alpha. The reliability of knowledge of pesticide use, knowledge of primary health care, psychological trait, psychological state, environmental education, inspiration of public mind for environmental conservation, and behavior of agriculturist for appropriate pesticide use for environmental conservation, and whole questionnaire, were 0.853, 0.958, 0.752, 0.866, 0.975, 0.967, 0.950 and 0.984 respectively. The cholinesterase level was determined by using serum drop on the reactive paper and covered with glass slide, then observing the color changing on paper. The interpretation are divided into 4 levels for yellow color is at level 1 that means normal level, light green color is at level 2 that means safe level, deep green color is level 3 that means risk level, and black color is level 4 that is unsafe level (Department of Health, 1997; Food and Drug Administration, 1997).

3. Data Collection

The questionnaire was used for data collection from agriculturists in Yasothon Province, Northeastern region, Thailand.

4. Data Analysis

The descriptive statistics used were frequency, percentage, mean and standard

deviation. Structural Equation Model (SEM) was used for model verification with LISREL version 8.30 by considering on Chi-Square value differs from zero with no statistical significant at 0.05 level or Chi-Square/df value with less or equal to 5, P-value with no statistical significant at 0.05 level and RMSEA (Root Mean Square Error Approximation) value with less than 0.05 including index level of model congruent value, GFI (Goodness of Fit Index) and index level of model congruent value, AGFI (Adjust Goodness of Fit Index) between 0.9-1.00.

Results

1. Confirmatory factors analysis of variables

1.1 Confirmatory factors Analysis of Variables of knowledge of pesticide use (Kno) predicting Cholinesterase Level (CH) was revealed as the following.

Confirmatory factors of Kno had Bartlett's test of Sphericity of 686.559 statistically significant level ($p< 0.01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy (MSA) of 0.712. This indicated that components of Kno aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 1.

Table 1 Results of confirmatory factors of Kno

Components of Kno	Weight	SE	t	R^2
X1 General Knowledge on Chemical Substance	0.35	0.043	8.17**	0.17
X2 Suitable Knowledge of Chemical Use	0.13	0.036	9.71**	0.25
X3 Chemical Impact to Environment	0.70	0.037	19.17**	0.71
X4 Chemical Impact to Health	0.74	0.033	20.08**	0.86
X5 Chemical Impact to Ecosystem	0.51	0.036	14.35**	0.45
Chi-square = 3.76	df = 3	P = 0.28834		
GFI = 1.00	AGFI = 0.98	RMSEA = 0.026	RMR =0.0094	

** Statistically significant level of 0.01

From Table 1, results of analysis of confirmatory factors of Kno from 5 observed variables was revealed that the model was congruent to empirical data by considering from 1) GFI equaled to 1.00 and AGFI equaled to 0.98 2) RMSEA equaled to 0.026 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of 0.01 and divided by degree of freedom was less than or equaled to 5.00 ($\chi^2/df \leq 5.00$).

Considering on loading weight of 5 observed variables in model, it was revealed that observed variables had loading weight with 0.13 to 0.74 and had covariate to model of Kno with 17.00 to 86.00 percents.

1.2 Confirmatory factors Analysis of Variables of Knowledge of Primary Health Care (HK) was revealed as the following.

Confirmatory factors of HK had Bartlett's test of Sphericity of 1010.776 statistically significant level ($p< 0.01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy (MSA) of 0.842. This indicated that components of HK aspects had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 2.

Table 2 Results of confirmatory factors of HK

Components of HK	Weight	SE	t	R^2
X6 Health Promotion Knowledge	0.57	0.031	18.32**	0.66
X7 Disease Prevention Knowledge	0.64	0.037	17.31**	0.65
X8 Health Care Knowledge	0.59	0.031	19.06**	0.70
X9 Health Rehabilitation Knowledge	0.57	0.029	19.25**	0.73
Chi-square = 0.00 df = 0 P = 1.0000				
GFI =1.00 AGFI =1.00 RMSEA = 0.000 RMR =0.0000				

** Statistically significant level of 0.01

From Table 2, results of analysis of confirmatory factors of HK from 4 observed variables was revealed that the model was congruent to empirical data by considering from 1) GFI equaled to 1.00 and AGFI equaled to 0.98 2) RMSEA equaled to 0.026 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of 0.01 and divided by degree of freedom was less than or equaled to 5.00 ($\chi^2/df \leq 5.00$).

Considering on loading weight of 4 observed variables in model, it was revealed that observed variables had loading weight with 0.57 to 0.64 and had covariate to model of HK with 65.00 to 73.00 percents.

1.3 Confirmatory factors Analysis of Variables of Psychological Trait (PsT) was revealed as the following.

Confirmatory factors of PsT had Bartlett's test of Sphericity of 211.956 statistically significant level (p< 0.01) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy (MSA) of 0.634. This indicated that components of PsT aspects had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 3.

Table 3 Results of confirmatory Factors of PsT

Components of PsT	Weight	SE	t	R^2
X10 Mental Health	0.33	0.043	7.81**	0.19
X11 Achievement Motive	0.37	0.039	9.44**	0.33
X12 Locus of Control	0.63	0.047	13.35**	0.84
X13 Future Oriented	0.51	0.046	11.17**	0.47
Chi-square = 0.00 df = 0 P = 1.0000				
GFI =1.00 AGFI =1.00 RMSEA = 0.000 RMR =0.0000				

** Statistically significant level of 0.01

From Table 3, results of analysis of confirmatory factors of PsT from 4 observed variables was revealed that the model was congruent to empirical data by considering from 1) GFI equaled to 1.00 and AGFI equaled to 0.98 2) RMSEA equaled to 0.026 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of 0.01 and divided by degree of freedom was less than or equaled to 5.00 ($\chi^2/df \leq 5.00$).

Considering on loading weight of 4 observed variables in model, it was revealed that observed variables had loading weight with 0.33 to 0.63 and had covariate to model of PsT with 19.00 to 84.00 percents.

1.4 Confirmatory factors Analysis of Variables of Psychological State (PsS) predicting CH was revealed as the following.

Confirmatory factors of PsS had Bartlett's test of Sphericity of 693.501 statistically significant level ($p< 0.01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy (MSA) of 0.806. This indicated that components of PsS aspects had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 4.

Table 4 Results of confirmatory factors of PsS

Components of PsS		Weight	SE	t	R^2
X14	Self-Value Living	0.53	0.030	17.60**	0.74
X15	Training Experience	0.51	0.032	16.01*	0.57
X16	Attitude toward Sufficiency	0.59	0.032	18.67**	0.80
X17	Social Norm Perception	0.45	0.033	13.77*	0.44
Chi-square = 0.03		df = 1		P = 0.86451	
GFI =1.00		AGFI =1.00		RMSEA = 0.000	RMR =0.00053

** Statistically significant level of 0.01

From Table 4, results of analysis of confirmatory factors of PsS from 4 observed variables was revealed that the model was congruent to empirical data by considering from 1) GFI equaled to 1.00 and AGFI equaled to 0.98 2) RMSEA equaled to 0.026 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of 0.01 and divided by degree of freedom was less than or equaled to 5.00 ($\chi^2/df \leq 5.00$).

Considering on loading weight of 4 observed variables in model, it was revealed that observed variables had loading weight with 0.45 to 0.59 and had covariate to model of PsS with 44.00 to 80.00 percents.

1.5 Confirmatory factors Analysis of Variables of Environmental Education (EE) was revealed as the following.

Confirmatory factors of EE had Bartlett's test of Sphericity of 1863.959 statistically significant level ($p< 0.01$) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy (MSA) of 0.882. This indicated that components of EE aspects had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 5.

Table 5 Results of confirmatory factors of EE

Components of EE		Weight	SE	t	R^2
X18	Knowledge and Understanding	0.63	0.029	21.67**	0.77
X19	Environmental Awareness	0.68	0.028	24.10**	0.87
X20	Environmental Attitude	0.69	0.029	23.69**	0.86
X21	Environmental Skill	0.49	0.031	15.81**	0.50
X22	Environmental Participation	0.60	0.029	21.54**	0.72
Chi-square = 2.79		df = 3		P = 0.42482	
GFI = 1.00		AGFI = 0.99		RMSEA = 0.000	RMR =0.0032

** Statistically significant level of 0.01

From Table 5, results of analysis of confirmatory factors of EE from 5 observed variables was revealed that the model was congruent to empirical data by considering from 1) GFI equaled to 1.00 and AGFI equaled to 0.98 2) RMSEA equaled to 0.026 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of 0.01 and divided by degree of freedom was less than or equaled to 5.00 ($\chi^2/df \leq 5.00$).

Considering on loading weight of 5 observed variables in model, it was revealed that observed variables had loading weight with 0.49 to 0.69 and had covariate to model of EE with 0.50 to 87.00 percents.

1.6 Confirmatory Factors Analysis of Variables of Environmental Conservation Inspiration (INS) was revealed as the following.

Confirmatory Factors of INS had Bartlett's test of Sphericity of 1030.795 statistically significant level (p< 0.01) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy/MSA) of 0.803. This indicated that components of INS aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 6.

Table 6 Results of confirmatory factors of INS

Components of INS	Weight	SE	t	R^2
Y6 Person as Role Model	0.60	0.033	18.00**	0.65
Y7 Impressive Event	0.60	0.031	19.67**	0.75
Y8 Impressive Media	0.53	0.033	16.40**	0.59
Y9 Impressive Environment	0.53	0.030	17.61**	0.63
Chi-square = 0.00	df =0	P = 1.00000		
GFI = 1.00	AGFI = 1.00	RMSEA = 0.000	RMR = 0.000	

**Statistically significant level of 0.01

From Table 6, results of analysis of confirmatory factors of INS from 4 observed variables was revealed that the model was congruent to empirical data by considering from 1) GFI equaled to 1.00 and AGFI equaled to 0.98 2) RMSEA equaled to 0.026 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of 0.01 and divided by degree of freedom was less than or equaled to 5.00 ($\chi^2/df \leq 5.00$).

Considering on loading weight of 4 observed variables in model, it was revealed that observed variables had loading weight with 0.53 to 0.60 and had covariate to model of INS with 59.00 to 75.00 percents.

1.7 Confirmatory Factors Analysis of Variables of Environmental Conservation Behavior (BEH) was revealed as the following.

Confirmatory Factors of Behavior of Agriculturist for BEH had Bartlett's test of Sphericity of 1430.088 statistically significant level (p< 0.01) and Kaiser–Mayer–Olkin Measure of Sampling Adequacy (MSA) of 0.852. This indicated that components of BEH aspect had proper relationship at good level and it can be used for analysis of confirmatory factors as shown in Table 7.

Table 7 Results confirmatory factors of BEH

Components of BEH	Weight	SE	t	R^2
Y1 Proper Behavior of Pesticide Use	0.56	0.033	17.12**	0.57
Y2 No Chemical Use Behavior as Alteration	0.55	0.030	18.01**	0.62
Y3 Environmental Conservation Behavior	0.64	0.029	22.20**	0.81
Y4 Chemical Prevention Behavior	0.65	0.030	21.63**	0.80
Y5 Knowledge Transferring for Environmental Conservation Behavior	0.60	0.031	19.29**	0.69
Chi-square = 1.72 df = 3 P = 0.63199				
GFI = 1.00 AGFI = 0.99 RMSEA = 0.000 RMR = 0.0031				

** Statistically significant level of 0.01

From Table 7, results of analysis of confirmatory factors of BEH from 5 observed variables was revealed that the model was congruent to empirical data by considering from 1) GFI equaled to 1.00 and AGFI equaled to 0.98 2) RMSEA equaled to 0.026 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of 0.01 and divided by degree of freedom was less than or equaled to 5.00 ($\chi^2/df \leq 5.00$).

Considering on loading weight of observed variables in model, it was revealed that observed variables had loading weight with 0.55 to 0.65 and had covariate to model of Environmental Conservation Behavior (BEH) with 57.00 to 81.00 percents.

2. Factors Predicting Cholinesterase Level

Analysis of the second order of Confirmatory Factors of Cholinesterase Level with 8 predictors of Knowledge of Pesticide Use (Kno), Knowledge of Primary Health Care (HK) Psychological Trait (PsT), Psychological State (PsS), Environmental Education (EE), Inspiration of Public Mind for Environmental Conservation (INS), and Environmental Conservation Behavior BEH). It was verified the congruence of structural model of Cholinesterase Level (CH) with empirical data from 171 indicators that was constructed from 31 sub-factors and 7 main factors including Kno, HK, PsT, PsS, EE, INS, and BEH as presented in Figure 1 and Table 8.

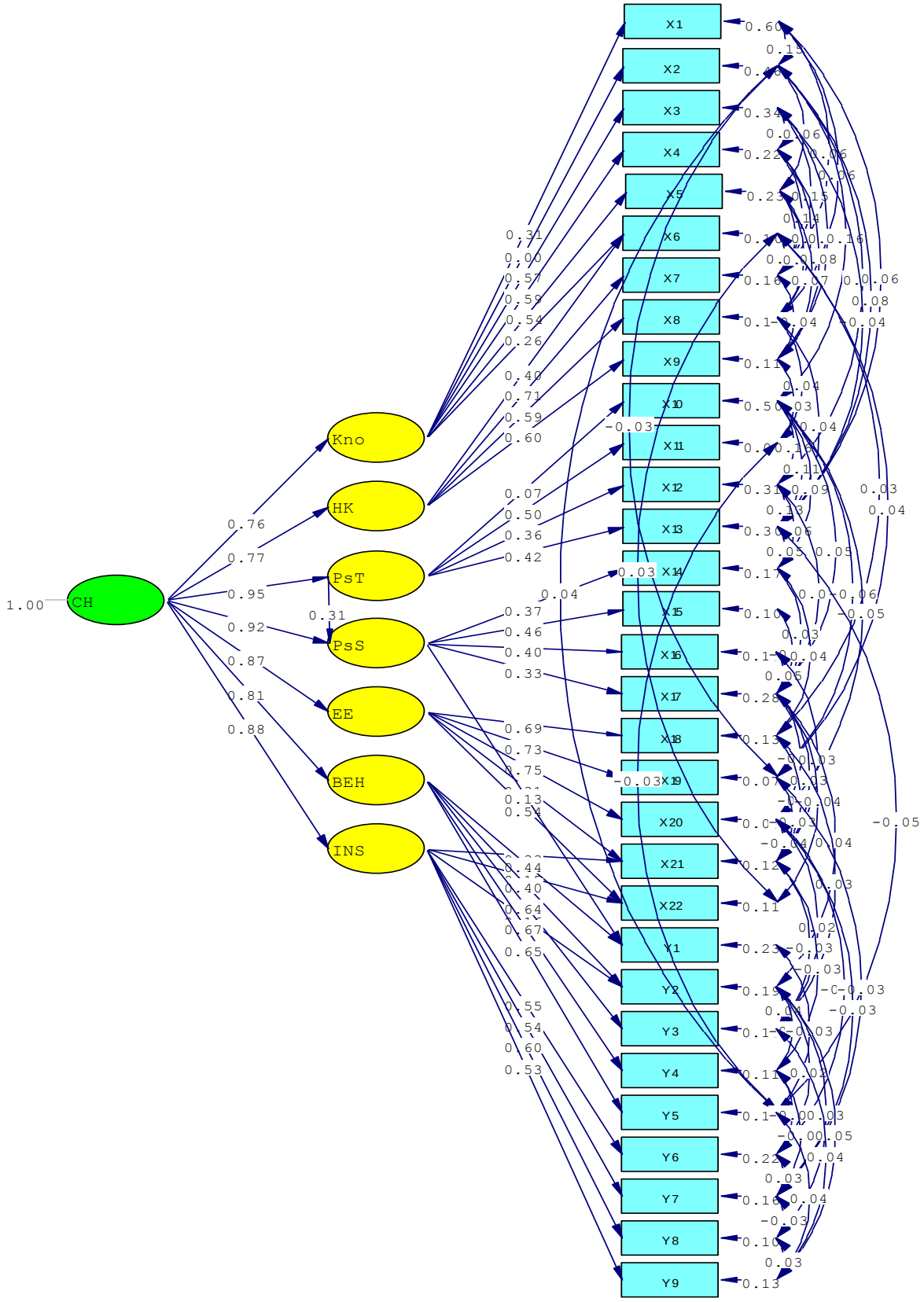

Figure 1. Model of Factors Predicting Cholinesterase Level

Table 8 Analysis of the Second Order of Confirmatory Factors of Cholinesterase Level

Variable	Matrix of Factor Loading			Prediction Co-efficient (R^2)
Analysis of the Second Order of Confirmatory Factors				
Kno	0.76	0.071	10.76**	0.51
HK	0.77	0.060	12.83**	0.64
PsT	0.95	0.10	9.19**	0.74
PsS	0.92	0.17	5.41**	0.93
EE	0.87	0.087	10.05**	0.90
BEH	0.81	0.063	12.99**	0.85
INS	0.88	0.76	11.43**	0.73

** P <0.01

From Figure 1 and Table 8, analysis of the second order of confirmatory factors of cholinesterase level, it was found that model was congruent to empirical data by considering on 1) GFI equaled to 1.00 and AGFI equaled to 0.98 2) RMSEA equaled to 0.026 (RMSEA < 0.05) and 3) Chi- Square value had no statistically significant at level of 0.01 and divided by degree of freedom was less than or equaled to 5.00 ($\chi^2/df \leq 5.00$).

Moreover, it was found that factor loading of 7 main factors had positive value from 0.75-0.95 with statistically significant at level of 0.01, therefore 7 factors was order from most values of loading factor to less values were PsT, PsS, INS, EE, BEH, HK, INS, and Kno with 0.95, 0.93, 0.88, 0.87, 0.81, 0.77 and 0.76 respectively.

The analysis of the second order of confirmatory factors of cholinesterase level was considered on co-efficient of factor score, thus loading factors affecting cholinesterase level can be written as following.

CH =0.95(PsT)+0.93(PsS)+0.88(INS)+0.87(EE) +0.81(BEH)+ 0.77(HK)+0.76(Kno)...(1)

Discussion

The findings indicated that PsT was the highest loading factor oncholinesterase level. Subsequences were PsS, INS, EE, BEH, HK, and Kno respectively. Its results were congruent to the study of Chomputawat et al., 2013b, who studied on "Causal Relationship Model of Environmental Conservation for Agriculturist" revealed that inspiration of public consciousness knowledge and understanding on chemical substance had the most effect to environmental conservation behavior with 0.89 and environmental education was the most effect to inspiration of public consciousness with 0.94.

Considering on prediction co-efficient (R^2), the PsS and EE in this study are the two highest prediction powers with 0.93 and 0.90. This might explicit that PsS and EE play important roles for using as stimulators to make Thai agriculturists for contacting pesticide carefully since the PsS composing Self-Value Living, Training Experience, Attitude toward Sufficiency and Social Norm Perception. Simultaneously, considering on prediction of correlation of observed variables of environmental awareness, environmental attitude, knowledge and understanding, environmental participation, and environmental skill, were at rather high levels with 0.87, 0.86, 0.77, 0.72, and 0.50 respectively. This were congruent to numerous studies of Thiengkamol and her colleagues (Chomputawat et al., 2013b; Donkonchum, and Thiengkamol, 2012; Gonggool et al., 2012b; Koonboonchan et al., 2013b; Phinnarach et al., 2012a; Thiengkamol, 2011i; Thiengkamol, 2011j; Thiengkamol, 2012d; Udonboon et al., 2012b) that the results illustrated that environmental education influencing environmental behaviors.

However the others factors such as PsT, INS, EE, BEH, HK, and Kno are also critical factors to predict the cholinesterase level of agriculturist, therefore all these factors can be integrated to accelerate the behavior change for pesticide use pattern based on knowledge of pesticide use, knowledge of primary care, environmental education, and psychological trait with inspiration of public consciousness for environmental conservation to meet better health (Chomputawat et al., 2013b; Koonboonchan et al., 2013b; Kotchachote et al., 2013b; Saisunantharom et al., 2013b; Thiengkamol, 2012d; Thiengkamol, 2012f; Thiengkamol, 2012h).

Thus, the research results should be introduced to apply into every agricultural activity in Thailand because Thailand has agricultural products for export and Thailand has an agricultural sector which shares only 8.4 percent of the Gross Domestic Product (GDP). The agriculturists lack of knowledge and realize the pesticide toxicity because they might familiar to use it since they has seen as they still at young age because they have begun use it for longer 5 decades. Moreover, they did received the information how seriously pesticide toxic effect that reported by Division of Epidemiology, Ministry of Public Health or even though from mass media communication to stress on the danger of pesticide poison from Bureau of Occupational and Environmental Diseases (2010). Additionally, Ministry of Public Health has only passive approach for the patient as the occupational and environmental diseases, therefore governmental sectors should pay attention by cooperating among different ministries whether Ministry of Public Health, Ministry of Agriculture and Cooperative, Ministry of Environment and Natural Resources, Ministry of Information and Communication Technology, and Ministry of Science and Technology to plan for limiting the import hazardous chemicals and putting emphasis on the organic cultivation subjectively including promoting knowledge and understanding, raising awareness and changing attitude and behavior of farming mold to alter by introducing organic approach for their cultivation.

However, it might be summarized that Kno, HK, PsT, PsS, EE, IPC and BEH variables are able to predict cholinesterase level and all variables are fitted with all observed variables according to criteria of Chi-Square value differs from zero with no statistical significant at 0.01 level or Chi-Square/df value with less or equal to 5, P-value with no statistical significant at 0.01 level and RMSEA (Root Mean Square Error Approximation) value with less than 0.05 including index level of model congruent value, GFI (Goodness of Fit Index) and index level of model congruent value, AGFI (Adjust Goodness of Fit Index) between 0.90-1.00.

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