

Model of Knowledge of Pesticide Use and Primary Health Care

รูปแบบความรู้การใช้สารกำจัดศัตรูพืชและการดูแลสุขภาพเบื้องต้น

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บทคัดย่อ

การวิจัยเชิงปริมาณที่เป็นการวิจัยเชิงสำรวจ ใช้แบบสอบถามเป็นเครื่องมือในการเก็บรวบรวมจากประชากรที่เป็นเกษตรกรในอำเภอคำเขื่อนแก้ว จังหวัดยโสธร ภาคตะวันออกเฉียงเหนือ ประเทศไทย จำนวน 70,546 คน ในปีพ.ศ. 2556 กลุ่มตัวอย่างที่ใช้ในการศึกษาได้จากการสุ่มแบบหลายขั้นตอน จำนวน 400 คน เป็นกลุ่มตัวอย่าง ใช้รูปแบบความสัมพันธ์เชิงโครงสร้างในการตรวจสอบสอดคล้องของข้อมูลเชิงประจักษ์กับสมมติฐานการวิจัย วัตถุประสงค์การวิจัยเพื่อพัฒนารูปแบบความสัมพันธ์เชิงโครงสร้างของความรู้การใช้สารกำจัดศัตรูพืช การดูแลสุขภาพเบื้องต้น ที่มีผลต่อพฤติกรรมการอนุรักษ์สิ่งแวดล้อมผ่านแรงบันดาลใจในการมีจิตสาธารณะเพื่ออนุรักษ์สิ่งแวดล้อม

ผลการวิจัยพบว่าความรู้การใช้สารกำจัดศัตรูพืช การดูแลสุขภาพเบื้องต้น และแรงบันดาลใจในการมีจิตสาธารณะเพื่ออนุรักษ์สิ่งแวดล้อมสามารถอธิบายความแปรปรวนของตัวแปรแฝงภายในของพฤติกรรมการอนุรักษ์สิ่งแวดล้อมได้ร้อยละ 89.00 และแรงบันดาลใจในการมีจิตสาธารณะเพื่ออนุรักษ์สิ่งแวดล้อมมีอิทธิพลสูงสุดต่อพฤติกรรมการอนุรักษ์สิ่งแวดล้อมเท่ากับ 0.73 รองลงมาคือ ความรู้การใช้สารกำจัดศัตรูพืช และการดูแลสุขภาพเบื้องต้น มีอิทธิพลต่อพฤติกรรมการอนุรักษ์สิ่งแวดล้อมเท่ากับ 0.13 และ 0.10 ตามลำดับ นอกจากนี้ความรู้การใช้สารกำจัดศัตรูพืช และการดูแลสุขภาพเบื้องต้นสามารถอธิบายความแปรปรวนของตัวแปรแฝงภายในแรงบันดาลใจในการมีจิตสาธารณะเพื่ออนุรักษ์สิ่งแวดล้อมได้ร้อยละ 79.00 การดูแลสุขภาพเบื้องต้นมีอิทธิพลสูงสุดต่อตัวแปรแฝงภายในแรงบันดาลใจในการมีจิตสาธารณะเพื่ออนุรักษ์สิ่งแวดล้อม เท่ากับ 0.74 รองลงมาคือความรู้การใช้สารกำจัดศัตรูพืชมีอิทธิพลเท่ากับ 0.15

คำสำคัญ: ความรู้การใช้สารกำจัดศัตรูพืช การดูแลสุขภาพเบื้องต้น แรงบันดาลใจในการมีจิตสาธารณะเพื่ออนุรักษ์สิ่งแวดล้อม พฤติกรรมการอนุรักษ์สิ่งแวดล้อม

Abstract

This research was quantitative research with survey approach. The questionnaire was used as an instrument for gathering data from population of 70,546 agriculturists in Yasothon Province in Northeastern region of Thailand. Multi-stage random sampling was conducted to collect 400 agriculturists as a sample group. Structural Equation model (SEM) was used for model validation. The objective was to develop a structural relationship model of knowledge of pesticide use and primary health care affecting to environmental conservation behavior through inspiration of public mind for environmental conservation.

Research results showed that Knowledge of Pesticide Use (KPU), Primary Health Care (PHC), and Inspiration of Public Mind for Environmental Conservation (INS) were able to explain the variation of Environmental Conservation Behavior (ECB) with 89.00 percent and INS had the most effect to ECB with 0.73, subsequences were KPU, and PHC with 0.13 and 0.10 respectively. Moreover, KPU and PHC were able to explain the variation of INS with 79.00 percent and PHC had the most effect to INS with 0.74. Subsequence was KPU with 0.15.

KeyWords : Knowledge of Pesticide Use; Primary Health Care; Inspiration of Public Mind for Environmental Conservation; Environmental Conservation Behavior

1. INTRODUCTION

Most farmers have extensively utilized the chemical substances over the world. In particular, in the developing least developed countries, there have been various reports identifying that these countries have heavily use pesticides, herbicide and rodenticide in order to increase their productivities. The chemical substance utilization of category and amount are related to sorts of user demands based on their purposes and occupations. These chemical substances cause harmful effects to human health, environmental quality, and biodiversity and ecological balance. In terms of human health, it impacts not only the users but also the consumers. The expert committee of World Health Organization on pesticide and herbicide anticipated that there were 500,000 persons receiving toxicity. The mortality rate was approximately 1-10 percent and it was associated with situations of treatment and handling. Nevertheless, the numbers of estimation of WHO, might be lower than the actual condition since these facts were mainly collected from 19 countries with their majorities from the developed countries [1][2]. The findings of WHO illustrated that approximately 99.00 percentages of patients were died because of pesticide toxic were in farming countries. These are developing and least developed countries; therefore “New third world’s disease” was given for acute poison of pesticide [1][3][4].

Any substance or mixture of substances that have action of prevention, destruction, or mitigation as pest repellents, are called pesticide therefore pesticide is implied to insecticides, herbicides, fungicides, and different other substances used to control pests. Pesticide is also any substance or mixture of substances proposed for utilization of a plant regulator, defoliant, or desiccant [5]. The scale of impact associated to the

kinds and quantity of chemical substance and this event mostly occurs in developing and least developed countries [1][2][6].

Moreover, WHO suggested the information in 2000, International Labour Organization was predictable that in each year, over 1.1 million across the world are patients with acute poison with pesticide. The 20,000 cases getting poison were accidentally when every cause was calculated, the finding showed that the patient amount of acute poisoning from pesticide user was raised to 2.9 million of the world. It is an original patients’ death with 220,000 cases per year [7].

Farmers or agriculturists are the most important living of Thai populace from historical age until now. They adjust type of plant cultivation from feeding household to be economic purpose. Particularly, in the Northeastern Region of Thailand, the farmers have turned to cultivate the economic plants such as rubber tree, sugar cane and padding corn increasingly, therefore pesticide utilization has been progressively used and it is a root of health impact, destruction of natural resources, and environment as they lack knowledge and understanding, awareness, positive attitude and corrected practice of pesticide use and environmental conservation. Thailand as agricultural country, it has been found that the rate of pesticide use for agriculture is more than other chemical substances. The report of 506 of Division of Epidemiology, Ministry of Public Health from B.E. 2527-2532 with no clear classification of type of poison source reception, thus the patients of 3,213 to 5,348 cases were sick with 5.03 to 9.63 per 100,000 people. Later, Division of Epidemiology, Ministry of Public Health stated that surveillance of disease caused by occupation and environment (passive policy) during B.E. 2546-2552 without included committed suicide source with pesticide, from report 506/2, it was found that the 459 cases

was classified as pesticide of 349 cases and other household chemical product of 110 cases. The people obtained pesticide poison while working and accident can be classified into 3 groups as poison from insecticide 181 cases (51.8%), herbicide 143 cases (41.0%) and rodenticide 25 cases (7.2%). The insecticide toxic effect was classified to originate by organophosphates with 91 case, carbamate with 6 case, pyrethroid with 2 cases. The herbicide toxic effect was classified to originate by paraquat of 34 cases, glyphosate of 22 cases, and other of 87 cases [1].

Quantity of chemical utilization in cultivation sector in Thailand is growing every year, it might come from a number of reasons such as being deficient in knowledge, awareness and law measurement including cheap and easy chemical access because it is lower price than other countries in Southeast Asia region and the buy-sell price doesn't include the cost of environmental damage and environmental impact. The pesticide import of agricultural sector of Thailand since B.E. 2545-2552, was found that it has risen three times import from 39,634 tons to 118,152 tons estimated in terms of money beginning from 9,116 million baht to 16,816 million baht. The herbicide, insecticide, fungicide are majority of fifty percentages. The increased amount of chemical substance in each time, it pointed out that the rate of chemical use is escalating as well and it causes the tremendous impacts for numerous following aspects because it requires the good prevention and control, therefore it has direct and indirect impacts to environment, ecosystem and human health system.

Thiengkamol stated that inspiration of public consciousness or public mind is dissimilar to motivation since it requires no admiration or complement or incentive. Particular in natural resources and environment conservation, inspiration of public mind happens from insight of someone. Moreover, its occurrence might come from pleasure in a person as a role model or an idol, event,

situation, environment, media perceiving such movies watching, book and magazine reading, and internet using [8][9][10][11]. In addition, the several researches have been carried out by her colleagues, these have also proved that inspiration of public consciousness or public mind is a critical factor for environmental conservation in diverse environmental management with combination of environmental education concept [12][13][14][15][16][17][18][19][20][21].

Yasothon Province contains a rural agricultural area with heavily cultivation of differently economic plants, therefore the pesticide use occurs. In order to reach sustainable development with environment conservation, the systemic organization with collaboration among ministry of Ministry of Agriculture and Cooperative, Ministry of Environment and Natural Resources, Ministry of Information and Communication Technology, Ministry of Public Health, and Ministry of Science and Technology should collaborate to issue shared policy and plan to holistically implement for saving farmers and universal life quality and for protecting environmental quality and ecological system for this and subsequent generations. Understanding the farmers' environmental conservation behavior, it requires to know latent variables of knowledge of pesticide use and primary health care including their inspiration of public mind for environmental conservation, therefore model of knowledge of pesticide use and primary health care for agriculturist in Yasothon Province is needed all mentioned latent variables are developed by constructing the observed variables to confirm for each latent variable to understand the holistic view of environmental conservation behavior of farmers by using agriculturist in Yasothon Province as a sample group to construct model of knowledge of pesticide use and primary health care. Office of Agriculture of Yasothon Province has launched the plan and projects to decrease the pesticide use and contamination during 2012-2014 for protecting and conserving the environment and natural resources.

2. OBJECTIVE

The objective of this research was to develop a causal relationship model of knowledge of pesticide use and primary health care of agriculturist in Yasothon Province.

3. METHODOLOGY

The research method was conducted by the followings:

3.1 Population and Sample

Population was 70,546 agriculturists during 2014 June in Yasothon of Northeastern region of Thailand. Sample were 400 agriculturists calculated by using Yamane formula to collect with Multi-stage random sampling technique at confident level with 0.05.

3.2 Research Tool

The content and structural validity of questionnaire were examined by Item Objective Congruent (IOC) from 5 experts in the fields of pesticide, public health, psychology, social science and social research methodology. The reliability was tried out by performing with the sample group from 40 agriculturists in the neighboring province. The reliability was calculated by Cronbach's Alpha formula. The knowledge of pesticide use composed of 35 items, primary health care composed of 28 items, inspiration of public mind for environmental conservation composed of 28 items, and environmental conservation behavior of agriculturist composed of 35 items, and whole questionnaire composed of 126 items. Their reliability were 0.853, 0.958, 0.967, 0.950 and 0.978 respectively.

3.3 Data Collection

The Multi-stage random sampling was used for sampling a sample group of 400 agriculturists in Yasothon Province. The research tool was the questionnaire and it was used for data collecting.

3.4 Data Analysis

The descriptive statistics employed 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 significance at 0.05 level or Chi-Square/df value with lesser or equal to 5, P-value with no statistical significance at 0.05 level and RMSEA (Root Mean Square Error Approximation) value with lesser 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 and critical number is more than 200.

4. RESULTS

The results of this study were as the followings.

4.1 Results of Effect among Variables in Model in Terms of Direct Effect

4.1.1 Confirmatory factors of KPU had direct effect INS with statistical significance at level of 0.05 with effect of 0.15. KPU had direct effect to ECB with statistical significance at level of 0.05 with effect of 0.13 and indirect effect ECB with statistical significance at level of 0.05 with effect of 0.11.

4.1.2 Confirmatory factors of PHC had direct effect to INS with statistical significance at level of 0.01 with effect of 0.74. PHC had direct effect to ECB with statistical significance at level of 0.05 with effect of 0.10 and indirect effect to ECB with statistical significance at level of 0.01 with effect of 0.54.

4.1.3 Confirmatory factors of INS had direct effect to ECB with statistically significant at level of 0.01 with effect of 0.73.

Considering on structural model confirmatory factors of component analysis of KPU, PHC and INS had direct effect to ECB with statistical significance at 0.01 level with effect of 89.00 %. The structural equation can be written as the following in equation (1).

$$ECB = 0.73 * INS + 0.13 * KPU + .10 * PHC \dots\dots\dots(1)$$
$$R^2 = 0.89$$

Equation (1) factors that had the most effect to ECB was INS with 0.73, subsequences were KPU,

and PHC, these were used to explain the variation of ECB with 89.00 percent

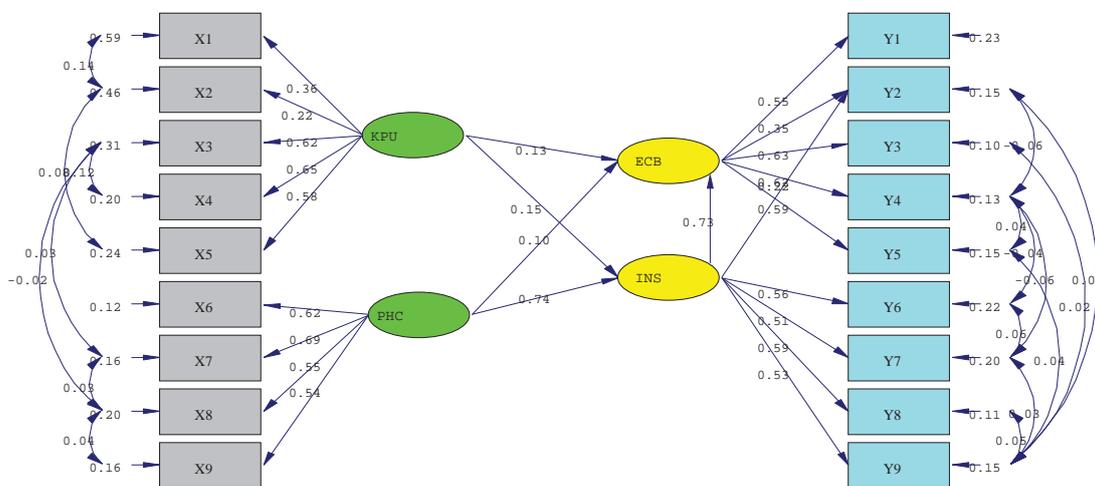
Considering of components that effected to INS of agriculturist, it illustrated that PHC was the most effect with 0.74. Subsequence was KPU with 0.15 and these were used to explain the variation of INS with 79.00%. The structural equation can be written as the following.

$$INS = 0.15 * KPU + 0.74 * PHC \dots\dots\dots(2)$$

$$R^2 = 0.79$$

Equation (2) factors that had the most effect to INS was PHC, and subsequence was KPU, these were able to explain the variation of Inspiration of Public Mind for Environmental Conservation (INS) with 79.00 percent.

The results of exogenous variables had effect to endogenous variables with direct and indirect effects were illustrated in figure 1 and table 1.



Chi-Square=195.32, df=111, P-value=0.00000, RMSEA=0.044

Figure 1: Model of Direct and Indirect Effect of KPU and PHC Affecting ECB via INS

Table 1 Direct, Indirect and Total Effects of KPU, and PHC Affecting ECB through INS

Causal variable	Result variables					
	INS			ECB		
	TE	IE	DE	TE	IE	DE
KPU	0.15* (0.041)	-	0.15* (0.041)	0.23* (0.023)	0.11* (0.033)	0.13* (0.032)
PHC	0.74** (0.16)	-	0.74** (0.16)	0.64** (0.15)	0.54** (0.13)	0.10* (0.012)
INS	-	-	-	0.73** (0.14)	-	0.73** (0.14)
$\chi^2 = 195.32$; df = 111		CN = 285.82		$\chi^2/df = 1.760$		
GFI = 0.95; AGFI = 0.92		RMSEA = 0.044		RMR = 0.017		

From table 1, it showed that the KPU and PHC had direct, indirect and total effect to ECB and it also had direct effect to INS. INS had direct effect to ECB.

5. DISCUSSIONS

The findings demonstrated that Knowledge of Pesticide Use (KPU) had direct effect to Environmental Conservation Behavior (ECB) with effect of 0.15. While considering on prediction of correlation of observed variables of Health Impact

from Chemical (X4), Environment Impact from Chemical (X3), Ecosystem Impact from Chemical (X5), Knowledge of Chemical Substance (X1), and Appropriate Chemical Use (X2), these can predict the Knowledge of Pesticide Use (KPU) with weights of 0.68, 0.62, 0.58, 0.36, and 0.22 respectively. Its results were consistent to the study of Chomputawat and his colleagues (2013a) who studied "Causal Relationship Model of Environmental Conservation for Agriculturist" and illustrated that Knowledge and Understanding on Chemical Substance (Kno) had direct effect to Environmental Conservation Behavior (BEH) with 0.16 and Kno was predicted by 6 observed variables of Chemical Impact to Air (X2), General Knowledge on Chemical Substance (X1), Chemical Impact to Soil (X4), Chemical Impact to Water (X3), Chemical Impact to Ecosystem (X5) and Chemical Impact to Life Quality (X6) with weight of 0.95, 0.86, 0.86, 0.72, 0.58, and 0.24 respectively [19]. It implied that the Knowledge of Pesticide Use is a critical matter to accelerate the agriculturists' behaviors of environmental conservation, thus it should be applied to educate them to gain deeper knowledge to be aware for pesticide harm in order to use it with precaution increasingly.

Moreover, regarding to Confirmatory factors of Primary Health Care (PHC) had direct effect to INS with effect of 0.74. PHC had direct effect to ECB with effect of 0.10 and indirect effect to ECB with 0.54. Simultaneously, considering on prediction of correlation of observed variables of Disease Prevention (X7), Health Care Promotion (X6), Health Care Providing (X8), and Health Rehabilitation (X9), therefore, this can predict the PHC with 0.69, 0.62, 0.55, and 0.54 respectively. These were consistent to several studies such as Phinnarach and her colleagues studied on "Causal Relationship Model of Community Strength" as the results showed that the latent variable of Self-Care Knowledge (SeC) had direct effect to Environmental Public Mind (PME) with 0.95 and Community Strength (CoS) composing of environmental

conservation behavior and health care behavior with 0.14 (Phinnarach et al., 2012a) and another work of Jukravalchaisri and his colleagues (2013) which researched on "Development Model of Elderly Health Care Behavior with Public Mind" as its results demonstrated that Elderly Health Care Knowledge (EHK) had direct effect to o Inspiration of Public Mind (IPM) with effect 0.08 and Health Behavior (HB) with effect 0.44 [22]. It is obviously seen that PHC exogenous latent variable in this study plays an important role to cause the environmental conservation behavior; thus it should be integrated in the training process of Ministry of Agriculture and Cooperative, Ministry of Environment and Natural Resources, Ministry of Public Health in the rural area to stimulate Thai agriculturists to be aware and realize to the pesticide poison in order for practicing with public mind to conserve the environment and maintaining the life quality.

Additionally, Inspiration of Public Mind for Environmental Conservation (INS) had direct effect to ECB with effect of 0.73 while considering on prediction of correlation of observed variables of Impressive Event (Y8), Person as Role Model (Y6), Public Mind (Y9) and Impressive Environment (Y7) can predict the INS with weight 0.59, 0.56, 0.53 and 0.51 respectively. These were congruent to different studies of Thiengkamol and her colleagues [9][15][16][17][18][19] as the results illustrated that Inspiration of Public Consciousness or public mind influencing to perform better environmental behaviors whether consumption behavior, energy conservation, forest conservation, recycling behavior, traveling behavior and knowledge transferring and supporting for environmental conservation.

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