Universal Journal of Public Health 11(3): 285-290, 2023 http://www.hrpub.org
DOI: 10.13189/ujph.2023.110301

Participatory Model Development of Partnership Network for the Health Impacts Prevention from Agricultural Pesticides Used among Farmers in Community

Valanchaya Ketbumroong[1,*], Sutthipong Wasusophaphon[2]

[1]Faculty of Public Health, Occupational Health and Safety, Vongchavalitkul University, Thailand
[2]National Health Commission Office, Thailand

Received February 22, 2023; Revised April 17, 2023; Accepted May 9, 2023

Cite This Paper in the Following Citation Styles

(a): *[1] Valanchaya Ketbumroong, Sutthipong Wasusophaphon , "Participatory Model Development of Partnership Network for the Health Impacts Prevention from Agricultural Pesticides Used among Farmers in Community," Universal Journal of Public Health, Vol. 11, No. 3, pp. 285 - 290, 2023. DOI: 10.13189/ujph.2023.110301.*

(b): *Valanchaya Ketbumroong, Sutthipong Wasusophaphon (2023). Participatory Model Development of Partnership Network for the Health Impacts Prevention from Agricultural Pesticides Used among Farmers in Community. Universal Journal of Public Health, 11(3), 285 - 290. DOI: 10.13189/ujph.2023.110301.*

Abstract The use of pesticides in agriculture among community farmers has greatly affected the health and the environmental system. Therefore, this research Objective: study to coordinate mechanisms and processes of partners network, and to develop a participatory model of partners network in preventing health impacts from the use of chemical pesticides by farmers in the community. This research is participatory action research. Materials and methods: The target groups were farmers, community leaders, religious leaders, local government organizations, government sector, private sector, and civil society networks in Phutsa Sub-district, Muang District, Nakhon Ratchasima province. The tools and processes used were the target group survey and brainstorming group meeting minutes to analyze problems and solutions. Data analysis used an induction qualitative analysis. Quantitative data used descriptive statistics to analyze general data. Conclusion: The research results found that the target groups who took part in solving the problems were from three sectors (government, academic, and civil society) most were female 67.0%, and farmers 72.2%. The partner network in preventing health impacts from the use of chemical pesticides by farmers in the community starts with 1) creating awareness and understanding of the situation, problems, and its impacts; 2) organizing participation mechanisms of stakeholders; 3) organizing the problem analysis process to assess health impacts and prepare proposals as academic measures, local community measures; 4) hearing opinions and make decisions together through public forums; 5) preparing joint action plans and support budgets for joint operations between organizations; 6) implementing proposals into action at both the policy level of government/local organization; 7) follow up, exchange, learn and evaluate empowerment. Prevention and solution of problems affecting farmers' health community members as well as consumers from the use of chemical pesticides, there must be mechanisms and processes for all sectors to continually participate in the goals at every step from the common perception of the problem and its impact, having a joint action plan between sectors, policy advocacy of local government organizations along with using social measures to motivate creativity to follow and receive benefits that occur in the community together.

Keywords Partners Network Participation, Pesticide Effects, Participation Model and Procedures

1. Introduction

Thailand is an agricultural country and most of the population is engaged in agriculture. The need for high-volume pesticide use in Thailand has continually increased. This is a result of accelerating the production of food to the maximum for large-scale subsistence and commercial production like in many countries in Southeast Asia. The large and long-standing use of pesticides is related to the knowledge, beliefs, attitudes, and self-defense behaviors of farmers. Moreover, the use of more pesticides than the recommended amount has caused problems. The exposure of toxic substances to the farmers' bodies and residues in agricultural products causes health problems for consumers and remains in the environment as well [1].

Phutsa Subdistrict, Mueang District, Nakhon Ratchasima Province has 745 households engaged in agriculture, with a plantation area of 16,176.25 rai. The main agricultural products are rice and vegetable gardens such as spring onions, morning glory, lettuce, kale, and coriander [2]. In 2016, there was a health check for farmers by detecting cholinesterase enzyme levels found to be insecure accounted for 45.16% and were at risk accounted for 32.25% and pesticide residues were found in onion vegetables. The group of chemicals most used by farmers in the Phutsa Sub-district in the paraquat group and carbamate group. The organophosphate group and the synthetic pyrethroid group are Carbofuran (41.88%), Abamectin (36.32%), and Paraquat (28.20%). Moss (18.37%), monocrotophos (16.23%) and dichlorvos (14.52%). Grade 3 (III) is mild toxicity and Level 1b (1b) is highly toxic. Studies have shown that carbaryl is chemical carbaryl and a chemical suspected to be carcinogenic. The type of chemical used by farmers is mainly in the carbamate group and organophosphate groups [3]. The study found carbofuran to be acutely toxic both neurotoxic and cardiovascular [4]. This can cause nausea, vomiting, abdominal cramps, sweating, diarrhea, excessive salivation, fatigue, loss of balance, blurry vision and difficulty breathing and chronic poisoning from long-term exposure to carbofuran, including cell degeneration or abnormal division of liver cells toxic to the reproductive system which short-term exposure to pesticides will affect irritation of the skin, eyes, nose, functions of the lungs, liver, kidneys, intestines and nervous system Chemicals in the organophosphate group, carbamate group, organochlorine group, and the pyrethroid group are difficult to decompose, resulting in being unable to maintain the natural balance, causing more severe and frequent pest infestations. Consequently, farming has to increase production costs. At the same time, the enforcement of unclear policies and lax laws or irresponsible promotions has had an impact on the health of farmers and consumers. This is the reason why problem-solving is ineffective as well.

From such information, therefore, there is a growing concern about the health impacts from the farming practices of local farmers and the use of chemicals is continual and increasing. This has affected the health of both producers and consumers. Concerns about the effects of pesticides on health and the environment have increased. Therefore, many sectors in the area need to find ways to reduce the impact and find solutions to problems. By brainstorming with key actors and policy alliances involved both directly and indirectly participate in the scope of the health impact assessment In determining the appropriate options to address the problem of keeping farming and food safe from pesticides, there is an important objective. To the development of a model of participation of network partners in preventing the health impacts of farmers and communities from the use of pesticides more effectively.

2. Materials and Methods

This research is participatory action research. The sample populations were 97 people both resident inside and outside Phutsa Sub-District, Muang District, Nakhon Ratchasima Province, who actively participated in the study of the problem and had the power to make decisions at every step. The samples were selected by purposive sampling consisting of the mayor of Phut Subdistrict Municipality, District Council President, Subdistrict Municipality Chief Administrator, school administrators, Director of Subdistrict Health Promoting Hospital, Subdistrict/district Agriculture, sub-district Priest, village headman, village health volunteers, and other volunteers, farmers, shop operators, consumer, people, and academics from educational institutions participated according to h roles and duties and continuous support in every step of the process in the community.

The research tools were the target group survey and the brainstorming group meeting minutes to analyze the problem and the solution, the campaign to raise public awareness and organizing activities according to various projects, and both formal and informal observation attendance records between October 2019-September 2020. There are 5 steps of the process and action research studies [5,6] as follows:

A. Pre-Research Phase

1) Survey and prepare health situation information related to farmers and communities in Phudsa Subdistrict.
2) Coordinate with other organizations, agencies, and people involved in the community to create awareness, and understand the problem and its impact on health.

B. Research Phase

1) Analyze the health problems of farmers and local people and the environment together with the community.
2) Group meetings/community forums, brainstorming, and defining the participation mechanisms of those involved.
3) Organize a workshop to present preliminary educational information to network partners to raise concerns about health, environment, society, and economy. Analyze problems to assess health impacts and make recommendations as academic measures, local community measures
4) Organize a workshop among the network partners involved to brainstorm, listen to opinions and decide together.

C. Planning Phase

1) Determine important projects/activities from the community group process.
2) Prepare a joint action plan and support the budget for joint operations between agencies/organizations both in the community and outside the community.

D. Implementation Phase

1) Determine the operational team by dividing the roles and duties by departments/organizations and volunteers.
2) Coordinate and drive the implementation of the action plan both at the level of government agencies and local government organizations.

E. Monitoring and Evaluation Phase

1) Determine the operational team by dividing the roles and duties by departments/organizations and volunteers to follow up.
2) Organize the follow-up process by exchanging knowledge and empowerment evaluation with the community.
3) Continuously submit follow-up results to the local community forum along with listening to suggestions for improvement.
4) Make an empowering provision visit to the community for action and self-reliance and amongst themselves in the community continued for 1 year after the first year of operation.

Descriptive statistics were used to analyze personal data and the general characteristics of the study population to find the frequency and percentage values. The data on the results of participation in the group process were categorized and content analyzed. Inductive qualitative content analysis was used according to the actual results of the community together with the analysis of the results of the activities of the community.

This study was certified in human research ethics from the Human Research Ethics Committee Maharaj Nakhon Ratchasima Hospital certificate number 306/2018 on April 19, 2018.

3. Results

The results of the study were divided into two parts, where the first part presented the general characteristics of the sample and the second part was the result of participation in the research process and steps.

3.1. Data Analysis of the General Characteristics of the Sample

The results of the research studies are as follows:

Table 1. Percentage of general information of participants in community group discussions (continued)

Population Characteristics	Number (n = 97)	Percentage
Gender		
Male	32	33.0
Female	65	67.0
Age		
30-60	81	83.5
Over 60	16	16.5
Marital Status		
Married	80	82.5
Widowed/Divorced/ Separated	17	17.5
Education		
Primary	77	79.4
Bachelor	15	15.5
Master	5	5.1
Occupation		
Government Officer	17	17.5
State Enterprise	3	3.1
Argriculturer	70	72.2
Trader	7	7.2

From Table 1, it was found that the target groups involved in solving problems most of them were female, 70 people (68.9%), average age between 30-60 years, 81 people (83.5%), married, 80 people (82.5%), had primary education, 77 people (79.4%) and agriculture 70 people (72.2%).

Table 2. Percentage of network partners, Relevant roles, and information acquisition

Population Characteristics	Number (n = 97)	Percentage
Government Sector	**11**	**11.3**
Subdistrict Municipality (Mayor, Municipal Clerk)	2	2.1
School (5 Schools)	5	5.1
Chief of District Agriculture	1	1.0
Subdistrict Health Promoting Hospital	2	2.1
Bank for Agriculture and Cooperatives	1	1.0
Academic	**5**	**5.2**
University	1	1.0
School	1	1.0
Subdistrict Health Promoting Hospital	2	2.1
Chief of Subdistrict Agriculture	1	1.1
Civil Society	81	**83.5**
Community Leader	18	18.5
Community Group President	63	65.0
Agriculture-Related		
Agricultural product producer	25	25.7
Supplier of produce and processed food products.	9	9.2
Production standards supervisor	3	3.1
Promoter of safe farming to reduce the use of chemicals	3	3.1
Consumers of agricultural products	57	58.7
Ways to receive information about the dangers of pesticides knowledge and community project activities (main channels)		
Interpersonal communication	32	33.0
Community broadcasting	20	20.6
Notice	20	20.6
Line, Facebook	25	25.8

From Table 2, it was found that most of the participating network partners were representatives from civil society, the Community Leader sector, and the community Group President = 81 people (83.5%), followed by the representatives from government agencies = 11 people (11.3%), while the academic sector = 5 people (5.2%). Agriculture-related, most of them were consumers of agricultural products = 57 people (58.7 %). The main ways to receive information about the dangers of pesticides knowledge and community project activities will be received from interpersonal communication = 32 people (33.0%) and via social media (Line, Facebook) =25 people (25.8%).

3.2. The Process of Participation of Network Partners in Preventing Health Impacts from Pesticide Use among Farmers at the Community

It is found that Government Sector, Academic,Civil Society and Agriculture-Related jointly determine the roles, functions, mechanisms, and participation in supporting information, manpower, budget, and materials in preventing health impacts on farmers and communities from the use of pesticides.

The process of participating in the health impact assessment and making proposals has been operated by an academic team as the main mechanism. Starting from the analysis of community potential, defining the scope and operating guidelines. Periodically assess the impact of information and exchanges from the community and review the assessment results and options. Make proposals that are technical measures, measures for local communities that support each other between different sectors. Then government agencies and local government organizations together with academic teams will be an important mechanism in organizing the process of hearing opinions and jointly making decisions on various proposals through community, and public forums to bring proposals

to form a joint action plan with the aim of the goal is for farmers in Phutsa sub-district. Change the production process that focuses on using bio-substances instead of pesticides from 100% agricultural chemicals to 70% safe agriculture and 10% GMP standards and create a support system to work together between agencies/organizations with a short-term plan each year. Support relevant agencies, namely sub-district municipalities, sub-district farmers, sub-district health promoting hospitals, village headman's club, and farmer groups to organize activities to screen for chemical contaminants in fresh food, fresh fruits and vegetables in the community shop and farmer's vegetable plots, organize health screening of farmers and consumers in the community for pesticide residues in the blood, develop the potential of farmers and consumers in safe food production and consumption including promoting organic farming in the community.

The operations carried out by three sectors (government, academic department, and civil society) together with the community pushing proposals into action at both the policy level, and state/local agency project plan level as well as expanding the network of cooperation and creating a learning process in the community. There is a follow-up, exchange of knowledge, and an empowerment evaluation by having a community committee together with related network partners together monitor the 4 levels of propulsion, which are key mechanisms: 1) monitoring the creation of mechanisms for participation from various sectors; 2) monitoring the creation of a process for participation in health impact assessment and decision-making; 3) monitoring the management planning process and create a support system in the community with participation; and 4) follow up mechanisms of agencies/organizations, networks, and communities to jointly drive action against impacts and public communication to people in various communities for cooperation.

4. Discussion

From the coordination of mechanisms and participation processes of partner networks in preventing health impacts from the use of pesticides by farmers in the community, it was found that knowledge and information on the health impacts of farmers and communities by local communities as bases that lead to behavior change in self-defense practices as well as reducing and eliminating the use of pesticides or change the way of production to be more organic. This is in line with the results of a study by Buppha Raksanama, et al [7] on the development of a model for reducing risk behaviors among farmers in Khok Yang Community, Trang Province, Thailand by providing knowledge on self-defense at the household level and having the community participate in the operation. Creating the participation of farmers and related parties since the beginning of development and troubleshooting. Creating a shared awareness of information, planning operations, operations, resource support, follow-up, and receiving mutual benefits including creating policy proposals and alternative operational measures. A study of David Hughes, et al. [8] on health effects of chemical use in Thailand, Vietnam, and Laos also support their knowledge of health risks and the level of self-protection. It is an important factor that is consistent with pesticide exposure and can be used to improve health care programs for policymakers. This is consistent with the study of Nawapon Buatana [9] on the health care participation process of farmers who use chemicals in Ban Huai Bong community, Mae Puem sub-district, Muang district, Phayao province, Thailand. The study found that by allowing farmers to participate in the process from the beginning, understand the problem, and share opinions can set goals together, find a solution to the problem, set up a farmer's activity plan and assign the person responsible for the operation, coordinate with the community and the government and related parties in operations to promote health care behaviors, change to organic agriculture. Therefore, farmers feel proud to participate and have a sense of ownership of the project, receiving very good cooperation.

Strengthening and continuity in the prevention of health impacts will require community participation in projects and activities, including the presence of a community committee mechanism to continuously monitor. This is consistent with the community participation model of Changwei Wang, et al [10]. This is consistent with the study of Yasir Mehmood, et al. [11] which found that perceived health risks and pesticide residues of farmers in Punjab Pakistan Intensive training and delivery of protective measures for health and sustainable agro-ecology will also be required. Therefore, the safety of pesticide use must be initiated by the household and have community activities, public forums and community committees for participatory action.

5. Conclusions

Prevention and solution to problems affecting farmers' health, community members as well as consumers from the use of pesticides, there must be mechanisms and processes for all sectors to participate in the goals continuously at every step from the common perception of the problem and its impact. Organize problem analysis processes to assess health impacts and make proposals as academic measures, local community measures, listening to opinions, and making decisions through public forums, having a joint action plan between sectors, policy advocacy of local administrative organizations along with the use of social measures for creative incentives to monitoring, exchange of learning and empowerment evaluation, and receive benefits that occur in the community together.

Recommendations: 1) Apply a model of participation in the prevention of health impacts from the use of agricultural chemicals in other areas to bring the results obtained to improve the model to be more efficient; 2) Promote organic agriculture or without the use of pesticides as an alternative to reducing and eliminating the use of pesticides; 3) Promote marketing for vegetable consumers, fruits and others that are safe or free from toxic residues to create a safe consumption trend; 4) Disseminate knowledge, awareness to farmers, producers and consumers along with the use of motivating and constructive social measures and government measures; 5) The network partners in Pudsa Subdistrict should adopt a model of participation of network partners in preventing the health impacts of farmers and communities from the use of pesticides to drive continuous operations and jointly plan a clear integrated work plan at the sub-district level.

Acknowledgements

This research was funded by Vongchavalitkul University. The authors would like to thank the network partners from 3 sectors, government, political, academic, and civil society in Phutsa Sub-District, Muang District, Nakhon Ratchasima Province. All research team for cooperation and for taking the time to participate in this research.

REFERENCES

[1] Health Systems Research Institute., "Report on the results of The study of knowledge needed to support better decision-making in Establish a policy for pesticides in Thai ", Nonthaburi, Department of Health Systems Research Institute, 2005.

[2] Phutsa Subdistrict Municiaplity., "Conditions and Basic Information of Phutsa Subdistrict Municipality", Nakhon Ratchasima, Department of Sub-district municipality, 2021.

[3] Ketbamroong V., Photipim M., J. Prathumyo, "Health Situation of Farmers From the Use of Pesticides in Group T60.0, Muang District, Nakhon Ratchasima Province." Journal of Health Research and Development Nakhon Ratchasima Public Health Provincial offoce, vol.6, no.2, pp.76-91, 2020.

[4] Bio Thai Foundation., "Statement to support the elimination of the use of deadly toxins alternative offer and measures to support farmers in the transition period." Nonthaburi, Feb. 5, 2021, https://biothai.net/ food- security situation/pesticide/5048.

[5] Cohen J., U. Norman, "Rural Development Participation: Concepts and Measures for Project Design, Implementation and Evaluation." New York, The Rurall Development Committee Center for International Studies, Cornell University, 1977.

[6] Wasusophaphon S., "Developing the process of participation of community groups/organizations in creating an environment conducive to good health." Phitsanulok, Thai family, 2004.

[7] Raksanama B., Suklimb N., A. Songthapa, "Model development to reduce pesticide risk behaviors among rubber farmers in Khogyang Community Trang Thailand." European Journal of Research on Education, vol. 2, no.2, pp.101-108, 2014, doi: 10.15527/ejre.201426253.

[8] Hughes D., Thongkum W., Tudpor K., Turnbull N., Yukalang N., Sychareun V., Van Vo T., Latt Win L., Watkins A.,S. Jordan, "Pesticides use and health impacts on farmers in Thailand, Vietnam, and Lao PDR: Protocol for a survey of knowledge behaviours and blood acetyl cholinesterase concentrations." Journal. plos, Sept. 10, 2021, doi: 10.1371/0258134.

[9] Buathana N., "The process of participation in health care of farmers who use chemicals in Ban Huai Bong community Mae Puem Sub-district, Mueang District Phayao Province." Journal of Buddhist Studies, vol.6, no.1, pp. 44-55, 2015.

[10] Wang C., W. Li., "Farmers' attitudes vs. government supervision: which one has a more significant impact on farmers' pesticide use in China." International Journal of Agricultural Sustainability, vol.19, no.3, pp. 213-226, 2021, doi: 10.1080/14735903.2021.1901465

[11] Mehmood Y., Arshad M., Kaechele H., Mahmood N., R. Kong., "Pesticide residues health risks and vegetable farmers risk perceptions in Punjab Pakistan." Human and Ecological Risk Assessment: An International Journal, vol.18, no.2, pp. 846-864, 2012, doi: 10.1080/10807039.2020.1776591.