The Development of Organic Agricultural Network to Market in School for Sustainable Community

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Abstract

This research aims to create a development approach of organic market in the Mahasarakham University Demonstration School (Secondary) and increase the awareness of the consumption of non-toxic agricultural produce and environmental conservation in students and villagers in the community. The samples consisted of 30 Don Yom villagers, Tha Khon Yang Sub-district, Kantharawichai District and 30 students of Mahasarakham University Demonstration School (Secondary) in academic year 2016-2017 selected by volunteer sampling. The research instruments were a questionnaire, activity participation form, and interview form. The research found that data analysis on cropping and agriculture, villagers cared for non-toxic cultivation. In the community, the villagers owned non-chemical and organic vegetable farms (81.67%). They did not use chemical for vegetable farming (83.33%). Most of them have alternative material instead of pesticides (93.33%), and most of which are biocatalyst from organics fermentation (60%). The Villagers in Don Yom and students were found to have a moderate level of awareness of consumption of non-toxic agricultural produce and environmental conservation. In

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general, the villagers were more aware than the students, with a significant difference level of .05. By using Pair *t*-test to compare the average income of organic agriculture network members, it was found that their income increased significantly after joining the network, with the significance level of .05.

Keywords: organic agriculture network, market in school, sustainable community

Introduction

As the global population continues to grow and economic and social developments are leaping, most people live big cities. They use the products bought from markets, especially food. People working in agricultural sector produce grow their crops and produces based on market mechanism. Some farmers have turned to rely on contract farming with private corporates and use factors of production from those companies including the seeds, animal breed, and their systems. This way, farmers are forced to join the endless circle of using animal feeds, fertilizers, and pesticides to ensure quality products that the market expects. To achieve market satisfaction, farmers need to rely more on chemicals in order to keep pests away and protect their crops. Inevitably, agricultural produces released to the market contain higher level of chemical contamination, posing higher risk for consumers' health. However, some groups of consumers and networks of farmers have been established (Starkey, 1997) and people have become more concerned over their health. They have learned the dangers of chemicals and understood the importance of healthy food consumption. The trend has shifted toward home-grown crops or organically grown vegetable and livestock. Situated in Tha Khon Yang Sub-district of Kantharawichai District, Mahasarakham, Ban Don Yom is a community where the majority are working in agricultural sector. They hold on to the traditional ways of life, culture, and folklore. The villagers are still growing vegetable on their properties for household consumption. In the meantime, the government is promoting financially sufficiency economic for the village. As a result, they have more budget to grow crops and livestock. According to the pilot research, after the financial support, every house in the village grow the same crops and animals, resulting in the issue of oversupply and they are unable to sell within the community. When they tried to sell their produces outside the community, there is no such space or market for them because the community is far from urban area where most large shopping centers are located. Most people in the province still prefer to buy food and other commodities at large department stores because it is more convenient to do so.

Based on the problem above, the researchers deem that it would be beneficial to open a market at Mahasarakham University Demonstration School

(Secondary) as an effort to establish the organic farm network in school. Also, by having a market in school, students can have a chance to learn from the community. It's a win-win situation where students can learn about organic agriculture and the community has a market to sell organic products to customers who are school students, parents, teachers, and MSU students and staff. This is rather a large target group with potential purchasing power. Therefore, the researchers wish to develop organic agriculture network to market in school for sustainable community according to King Bhumibol's initiative about sufficiency economy.

Research hypotheses

1. Students and villagers have different awareness levels in consumption of non-toxic agricultural produce and environment.

2. Villagers at Ban Don Yom have more income by becoming members of organic agricultural market in school.

Objectives

1. To create the development approach for organic agricultural market in Mahasarakham University Demonstration School (Secondary).

2. To create awareness on consumption of non-toxic products and environment for students and villagers

Research Methodology

Population and Samples

The population in this research included 293 villagers at Ban Don Yom, Tha Khon Yang Sub-district, Kantharawichai District and 30 students from Mahasarakham University Demonstration School (Secondary) in academic year 2016-2017. Samples included 30 villagers at Ban Don Yom, Tha Khon Yang Sub-district, Kantharawichai District and 30 students from Mahasarakham University Demonstration School (Secondary) in academic year 2016-2017 selected by volunteer sampling method.

Research Designs

The research designs used in this study are qualitative research and one group pretest-posttest design (Thongbu, 2007).

Research Tools

The research tools can be divided into 2 sets: the actual research tools and the data collection tools

Set 1 includes the actual research tools i.e. the organic agriculture development network and market development process in school consisting of action planning, focus group meeting, network member training, and organic agriculture field trip between students and the community.

Set 2 includes the data collection tools which can be divided into 2 groups:

2.1 Qualitative data are collected using in-depth interview and the guideline questions for focus group discussion on details of organic agriculture at Ban Don Yom community, plant and animal species that they grow and sell at the market school, and the implementation and coordination on receiving products from the community.

2.2 Quantitative data are collected using a survey, a questionnaire, and by asking questions on the operation of school market, which are divided into 3 sections below:

Section 1: A survey form on the income of villagers before and after the Introduction of organic agriculture network into market school

Section 2: An survey form on the operation of the market selling organic agriculture produces in school which in the form of 5 rating scale ranging from the highest, high, medium, low, and very low.

Section 3: A survey form on awareness of the consumption of organic agriculture product and the awareness of the environment which in the form of 5 rating scale ranging from the highest, high, medium, low, and very low.

The method for creating and achieving the quality of research tools

The process of creating and achieving the quality of research tools on the awareness of consumption of organic agriculture and environmental conservation is as below.

To develop the questionnaire on the awareness of consumption of organic agriculture, index of item-objective congruence (IOC) was applied. The scoring criteria are as follows:

Scoring +1 Certain that the test is congruent with the objectives or content

Scoring 0 Uncertain that the test is congruent with the objectives or content

Scoring -1 Certain that the test is NOT congruent with the objectives or content

IOC was used to analyze item-objective congruence of the content. Only the items with the minimum score of 0.5 were selected to calculate the discrimination of each questionnaire item using item-total correlation. Confidence was calculated using α –Cronbach Coefficient with a condition that the questionnaire needs to be of at least .80 confidence. Based on the analysis, every questionnaire item on the awareness of consumption of organic agriculture had the IOC score over 0.50, discrimination more than the critical value of 0.361 and the overall confidence of 0.89. The figures prove that the questionnaire can be used to measure the awareness of consumption of organic agriculture and environmental conservation. Suitability of the questionnaire was evaluated by experts using a scale of 1-5. The meaning of each rating score is as explained below. (Srisa-ard, 1992: 100). It is determined that the mean congruity score of 3.51 or above as evaluated by experts is acceptable to be used. The actual average congruity score was 4.80, which is at the level of highest congruity, validating that the questionnaire can be used.

The survey form is created. Its congruity is evaluated by experts using the rating scale of 1-5. It is determined that the mean congruity score of 3.51 or above as evaluated by experts is acceptable to be used. The actual average congruity score was 4.72, which is at the level of highest congruity, validating that the questionnaire can be used.

Data collection

Stage 1

1. The researchers conduct research from documents, textbooks, and relevant theories and previous literatures.

2. The researchers examine basic information and the history of the community, including its context, socio-economic backgrounds, and agricultural problems, and conduct the survey on farming in the community, utilization of local plants and animals, and marketing problems of agricultural products of the community.

Stage 2

1. The researchers draft the research proposal and consult the chairman of Foundation of Environmental Education and community leaders on the method to promote organic agriculture for community members by including it into the learning process of students at Mahasarakham University Demonstration School (Secondary).

2. The researchers make the data collection tools and evaluate the quality of the tools. Experts evaluating the quality of the tools include 5 lecturers from Department of Environment Studies, Faculty of Environment and Resource Studies, Mahasarakham University.

Stage 3

1. The project is proposed to found the organic market network in school for sustainable community to join the White Camp organized by Krung Thai Bank. The project is submitted to participate in a contest and ask for financial support. In addition, it is an integrated learning process on sufficiency economy for students.

2. Sub-group meeting is held with participation from community leaders and villagers who are interested in joining the project. Application is open for those who wish to become members of the network. Resources in the community are surveyed.

3. The network members attended the training on non-toxic agriculture and environmental awareness.

4. A center of the community and the operation committee were establish. A coordinator was assigned to collect agricultural produce from the members on Thursdays and Fridays.

5. The organic market was open at Mahasarakham University Demonstration School (Secondary) on Fridays. Students were responsible for selling agricultural produce e.g. vegetables, livestock products, and non-toxic agricultural produce to other students, parents, and people in general.

6. The researchers collected data from the network members, students, and parents by interview and questionnaire.

7. Data on income of network members were collected using the interview and accounting checks. The network members were told to record their incomes and expenses in the accounting survey form to compare their incomes before and after joining the organic agriculture network to market in school.

Data analysis

1. The action plan and development process of organic agriculture network and market in school is analyzed in collaboration with focus group meetings with community members, community leaders, and project advisers.

2. The context of the community is analyzed based on the field data survey and interviews.

3. Awareness of the consumption of organic agriculture produce and environmental conservation among the members of organic agriculture market network, students, and community network members using independent *t*-test.

4. The average income of the members before joining organic agriculture market network in school using paired t-test.

Statistics used for data analysis

Statistical used in the research are as follows:

1. Basic statistics

1.1 Frequency and percentage

1.2 Average

1.3 Standard deviation

2. Statistics used for evaluating the effectiveness of the research tools

2.1 Item-objective congruence score of the questionnaire based on evaluation by experts.

2.2 Congruity of the questionnaire based on evaluation by experts.

2.3 Distribution of each questionnaire item is calculated to measure the awareness of the consumption of organic agriculture produce and environmental conservation using item-total correlation.

2.4 Confidence of the check list and the form for evaluating the awareness of the consumption of organic agriculture produce and environmental conservation according to the formula of α –Cronbach Coefficient.

2.5 Statistics used for testing the results and hypothesis is the paired *t*-test comparing the income of the members before joining organic agriculture market network in school.

2.6 Statistics comparing the awareness of the consumption of organic agriculture produce and environmental conservation among the members

of organic agriculture market network, students, and community network members is independent *t*-test.

Results

According to the data analysis on vegetable growing, most of Ban Don Yom villagers were aware of non-toxic vegetables and perceived them as those without chemical residues (96.67%), followed by strictly chemical-free (86.67%), and pesticide residue-free vegetables (73.33%). The villagers perceived organic vegetables as non-toxic vegetables (63.33%), and synthetic chemical-free vegetables (50%). In the community, 81.67% of the vegetable farms were growing non-toxic vegetables and organic vegetables. The number of community members not using chemicals in their farms accounted for 83.33%. They opted for other products to substitute for pesticides (93.33%), e.g. biocatalyst (60%), followed by compost (53.33%), fermented herbs, and pest-resistant plants, respectively. The integration of learning and development of awareness on environmental preservation and consumption of non-toxic products of students and villagers by training students and villagers to the interventions in learning activities followed students set up organic agricultural market in schools by receiving non-toxic organic agricultural products from villagers in the school every Friday of the week. According to the interviewing Ban Don Yom villagers, it was found that critical success factors that most Ban Don Yom villagers regarded as the most important are parents and other customers buying agricultural product at the school market, the network members in the community, the management members of the project, and the financial supports. Other factors e.g. students, teachers, and school staff were regard as high importance. Similarly, the critical success factors that students regarded as the most important were network members in the community, management members of the project, and parents and customers buying the products, while students, teachers, and school staff as high importance.

The comparison results of the average awareness of the consumption of organic agriculture produce and environmental conservation between Ban Don Yom villagers and the students

Topics	Villagers (N=5)			Students (N=5)			t	P
	$\bar{X}$	S.D.	Level	$\bar{X}$	S.D.	Level		
Awareness (n=30)	3.12	0.31	medium	2.97	0.59	medium	-3.021	.004*

*Statistical significance of .05 (Independent t-test)

The comparison result of average income of villagers before and after becoming the market network members

Income	Average monthly income before joining the project			Average monthly income after joining the project			t	P
	Net income (baht)	$\bar{X}$	S.D.	Net income (baht)	$\bar{X}$	S.D.		
Villagers (n=30)	16,060	5,535.33	5567.3	18,7150	6,238.3	6238.3	-4.689	0.00*

*Statistical significance of .05 (Independent .05 (Pair t-test)

Conclusion

According to the study on the development of organic agriculture network toward school market for sustainable community, the initial survey revealed that the participants were 30 Ban Don Yom villagers, 18 of which were female (60%) and 12 others male (40%), and 18 of which were holding agricultural professions (60%), followed by government officials and merchants.

According to the data analysis on vegetable growing, most of Ban Don Yom villagers were aware of non-toxic vegetables and perceived them as those without chemical residues (96.67%), followed by strictly chemical-free (86.67%), and pesticide residue-free vegetables (73.33%). The villagers perceived organic vegetables as non-toxic vegetables (63.33%), and synthetic chemical-free vegetables (50%). In the community, 81.67% of the vegetable farms were growing non-toxic vegetables and organic vegetables. The number of community members not using chemicals in their farms accounted for 83.33%. They opted for other products to substitute for pesticides (93.33%), e.g. biocatalyst (60%), followed by compost (53.33%), fermented herbs, and pest-resistant plants, respectively. By the interviewing Ban Don Yom villagers, it was found that critical success factors that most Ban Don Yom villagers regarded as the most important are parents and other customers buying agricultural product at the school market, the network members in the community, and the management members of the project. The awareness of the consumption of organic agriculture produce and environmental conservation among Ban Don Yom villagers and students was found at medium level. To be precise, Ban Don Yom villagers in general had higher awareness of organic agriculture produce and environmental conservation than students, with statistical significance of .05.

The average income of 30 villagers 3 months before joining the network using the income survey and interview was 5,535.33 baht per month and increased to 6,238.3 baht 3 months after joining the network. Using paired *t*-test, the average income of the villagers increased with the statistical significance of .05.

Discussion

According to the problem survey at Ban Don Yom, Tha Khon Yang Sub-district, Kantharawichai District, Mahasarakham Province, most villagers are farmers. They lead simple lives and hold on to traditional Isan lifestyle and culture. They started to grow the plants and raise the animals with more budget provided by the government. Despite the goal to support the villagers, the budget also entails another problem. With more money, the villagers own more plants and animals of the similar kinds. Therefore, it is difficult to find a market to sell these products within the community due to oversupply. In this community, the non-toxic and organic vegetable farming accounted for 81.67% and those not using synthetic chemical for farming up to 83.33%. They opted for other products to substitute for pesticides (93.33%), e.g. biocatalyst (60%), followed by compost (53.33%), fermented herbs, and pest-resistant plants, respectively. This findings are consistent with the previous studies by Boonyoo (2011), Siriphanupong (2003), and Chongkanokphon (2013). The integration of learning and development of awareness on environmental preservation and consumption of non-toxic products of students and villagers by training students and villagers to the interventions in learning activities followed students set up organic agricultural market in schools by receiving non-toxic organic agricultural products from villagers in the school every Friday of the week. After implementing the project, many villagers have become interested. According the analysis and interview on vegetable growing and other farming, the villagers grow higher awareness of non-toxic plantation.

The awareness of consumption of non-toxic agricultural produce and environmental conservation among Ban Don Yom Villagers and students was found to be at the medium level. To be accurate, the villagers had higher awareness score than students with statistical significance of .05. The statistics shows that villagers who grow vegetables care for the consumers' health and their own. They have strong awareness of consumption of non-toxic agricultural produce and environmental conservation as they are trying to minimize the extent of chemical residue. To do so, they introduce biocatalyst to substitute for chemicals and manage their farms with local wisdom and natural methods. The findings are consistent with Inmuong *et al*., (2007) who examined organic farming ecosystem of Khammee Laowongmi from Ban Don Daeng, Kantharawichai District, Mahasarakham Province. In the latter research, the researchers collected data by surveying, observing, and interviewing, before analyzing the data. According to the analysis, the farmers applied local wisdom with modern technologies in their organic farming ecosystem. The present research findings also agree with that of Khamchantharat (2011) who discovered that by using organic farming management method the farmers try to avoid

introducing external production capitals to be used in their farms, especially synthetic chemicals. Instead, they opted to maximize the use of recyclable materials in the farm, which is a way to conserve the environment and increase the yield of the existing crops. The production capitals that they use are green manure, biocatalyst made from plants and animals that farmers produce by using local wisdom and modern knowledge. Also, the principle of sufficiency economy has been practiced to move toward success in life.

According to the comparison results of average income of the villagers before and after joining the network, their income increased with statistical significance of .05. This proves that by applying sufficiency economy principles, their agricultural products that are left from household consumption or produced at higher volume can be sold to the market. Furthermore, the villagers even showed their strength and sustainability by grouping up to open the community meeting on Sundays to exchange the products within their own community and allow outsiders to buy the products in this market. This is a proof that the origin of organic agriculture market network in school market can create sustainability of the community as the villagers have learned and applied the management method to their community and outsiders toward more extensive area. It has developed the new working system for villagers to manage their market. Other members and villagers have observed the operation, leading to a larger network and more members. One thing that the villagers take seriously is the founding of seed bank using the school as the center. The bank collects local plant seeds and lends them for people who wish to grow the plants. In turn, the seed loaners need to collect the seeds for the next season and return their seeds to the bank at bigger quantity, resulting in a larger stock. This is the mechanism of conserving local plant genetics and create sustainable plantation without reliance on seeds from private companies. In the future, the villagers will have more various seeds and can exchange them within the community or expand to nearby villages. As a result, the community will become more sustainable and the environment within the community will be well conserved.

Suggestion

1. The research should be conducted for a longer timeframe in order to examine the development of organic agriculture network.

2. The development of organic agriculture network should be more integrated into learning activities for students in order to instill the awareness of non-toxic vegetable consumption and environment conservation.

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References

Boonyoo, W. (2011). *Development of community level non-toxic vegetable market operation at Ban Nikhom Health Promotion Hospital, Krachai Sub-district, Pa Tio District, Yasothon Province.* Master's Degree Thesis in Public Health. Mahasarakham University. Mahasarakham. (in Thai).

Chongkanokphon, C. (2014). *Development method for non-toxic vegetable network operation in Borabue Hospital, Borabue District, Mahasarakham.* Thesis. (in Thai).

Inmuong, Y. *et al.* (2007). *Organic farm ecosystem management.* Research Report. Mahasarakham University. Mahasarakham. (in Thai).

Khamchantharat, B. (2011). *Organic farm activities enhancing the development of sustainable agriculture in rural areas.* Ph.D. thesis in Environmental Studies. Mahasarakham University. (in Thai).

Siriphanupong, R. (2003). *Customer behavior and demand for household vegetable consumption in bangkok.* Bangkok: Thai Thesis Database.

Srisa-ard, B. (1992). *Basic research.* 2nd edition. Suweeriyasan. Bangkok. (in Thai).

Starkey, P. (1997). *Networking for development***,** IFRTD (The International Forum for Rural Transport and Development).

Thongbu, S. (2007). *Educational research*. Faculty of Education, Rajabhat Mahasarakham University. Mahasarakham. (in Thai).