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The campaign for effective reduction of sugarcane burning before transporting them to the factory aimed specifically at KhokKlang Community, Nong No Sub-district, Kranuan District, Khon Kean Province

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The purposes of this research were to 1) study and compare knowledge about reduction of sugarcane field burning before and after the campaign, 2) study and compare attitude towards reduction of sugarcane field burning before and after the campaign, and 3) study participation in the sugarcane Burning Reduction Campaign. The samples were 30 residents in KhokKlang Community, Nong No Sub-district, Kranuan District, Khon Kean Province. They all volunteered to join the campaign. The research tools consisted of a manual, a knowledge test, an attitude test and a participation evaluation form. The statistics used included frequency, percentage, mean and standard deviation, and paired t-test was employed for hypothesis testing. The results showed that 1) The villagers' knowledge before joining the campaign was at the "low" level, but after participating in the campaign their knowledge was found to be at the "high" level, 2) The attitude of the villagers before joining the campaign was at the "not sure" level. However, their attitude changed to the "agree" level after they had joined the campaign, and 3) After the campaign, their participation was found to be at the "high" level. When comparing the mean scores in terms of both knowledge and attitude, it was found that their gain scores were higher than those gained before they participated in the campaign. This was consistent with the research hypotheses which stated that both knowledge and attitude after the campaign were higher than those before the campaign and they would be at the "high" level based on the significance level of .05

Keywords: campaign, sugarcane burning reduction, knowledge, attitude, participation

Introduction

The Seventh National Economic and Social Plan aims to encourage agricultural sectors to restructure their manufacturing processes to be more responsive to the market demand, as well as to improve their agriculture

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processing industry and increase investments. The agricultural support systems provided by the government in the past placed an emphasis on promotion items toward small-scale agricultural planning and development by the farmers themselves. In this regard, the government's role was to provide help, support, and collaboration and to help solve problems based on the decisions or the choices the farmers chose, thus bridging the gap between the government and the citizens in a complete integrated way (Ministry of Agriculture and Cooperatives, 2016). According the statistics by Department of Alternative Energy Development and Efficiency, Thailand tends to import fuel oil more and more every year. In 2009, it imported 45,607 liters of crude oil (286,855 thousand barrels) which could be accumulated to 83.79%. In fact, its capability to produce oil for domestic consumption was 8,820 million liters (55,474 thousand barrels), accumulated to 16.21%. Oil consumption have constantly been increasing since 2009 at a rate of .09 percent--from 107.71 million liters a day (677,479 barrels) to 108.66 million liters (683,441 barrels). Thailand has been affected by oil price uncertainty and, of course, by the fact that oil prices have a tendency to rise. As a result, the Thai government has formulated its posture toward the development of its benzene resources (also known as gasohol) since 2001. The government encourages more use of gasohol to cut down crude oil imports (Bank of Thailand's Northeastern Region Office. 2012: 21-22). According to Department of Alternative Energy Development and Efficiency, ethanol production in 2010 was larger than that in 2000—from 191.75 million liters to 322.19 million liters, or an output of 8.8 hundred million litters a day. Then, a lot of farmers started to expand their land to grow energy crops, especially sugarcane. Now the areas that used to be forests or paddy fields have been transformed to the areas for the expansion of energy crop production (Khansila *et al*., 2014).

Despite the fact that Thailand is the world's fourth largest sugar exporter, its sugarcane farmers are still struggling with low price, overproduction, high production cost, and shortage of labor, and, particularly, higher labor wage which could be accounted for 50% of the entire cost for each growing season. Therefore, some farmers prefer to burn their sugarcane field before and after harvesting in order to reduce labor costs. This can result in both short-term and long-term problems such as emission of greenhouse gases, degradation of soil structure, toxic chemical spills, water supply problems, problems associated with sugar production or sugar quality, and decrease in productivity of the sugar factory. These problems need to be solved urgently, and at the same time farmers should be encouraged to cut away the leafy parts of sugar cane instead of burning them off, according to Sangla *et al*. (2005).

Ninety-five percent of the land in KhokKlang Community, Nong No Sub-district, Kranuan District, Khon Kean Province are used for sugarcane production which relies heavily on rainwater as the main irrigation source. In some year, the crop yield is low due to insufficient rainfall. Besides, sugarcane farmers are battling with high production costs, but disappointing yields and low profits. Sometimes labor shortage occurs. According to the preliminary survey, some farmers tend to burn their sugarcane before harvesting. They do that because they don't have enough labor to help with harvesting. Burned sugarcane needs to be sent to the factory immediately, otherwise their sweetness quality could be reduced. In that case, their price could be lowered by 10 or 20 baht per ton as the factory might claim that they are of low quality. Moreover, sugarcane burning is harmful to human health and the environment. Other negative impacts of sugarcane field burning on sugarcane juice quality include a reduction in the weight of sugarcane, lower sweetness quality, loss of sugar during the sugar manufacturing process, lower production of each sugarcane plant, and higher production cost.

Burning sugarcane fields, regardless of before or after harvesting, has a direct impact on both farmers and factories. Emissions from sugarcane burning cause harm to the sugarcane ecosystems as they destroy minerals in the soil and deteriorate soil structure. Sugarcane burning is also a contributor to global warming, air pollution, soil contamination, and a number of environmental problems. Recognizing that air and soil pollution have a great impact on environment and ecosystems, the researcher, therefore, decided to launch a campaign on effective reduction of sugarcane burning before transporting them to the factory so that famers would have a better understanding and appropriate attitude towards sugarcane field burning, and help to protect the environment through this campaign.

Purposes of the study

1. To study and compare knowledge on "how to effectively reduce sugarcane burning before transporting them to the factory" of the farmers at KhokKlang Community in Nong No Sub-district, Kranuan District, Khon Kean Province, before and after the campaign

2. To study and compare attitudes toward "how to effectively reduce sugarcane burning before transporting them to the factory" of the farmers at KhokKlang Community in Nong No Sub-district, Kranuan District, Khon Kean Province, before and after the campaign

3. To study participation in sugarcane burning reduction-related activities of KhokKlang Community, Nong No Sub-district, Kranuan District, Khon Kean Province, before and after the campaign

Research hypotheses

1) The villagers have better knowledge and attitudes toward effective reduction of sugarcane burning before transporting them to the factory than before they join the campaign.

2) The villagers' participation in the campaign for effective reduction of sugarcane burning before transporting them to the factory is at the 'high' level.

Significance of the study

The villagers will have correct knowledge and understanding as well as positive attitudes toward reduction of sugarcane field burning. Therefore, they can help to reduce air pollution and this is one of the ways to help reduce global warming, too.

Scope of the study

Studied site: A total of 4,700 rai square in KhokKlang Community, Nong No Sub-district, Kranuan District, Khon Kean Province

Population and sample

Population: A total of 1,173 people from 225 houses in KhokKlang Village, Nong No Sub-district, Kranuan District, Khon Kean Province, composed of 581 men and 592 women Sample: 30 people, who volunteered to join the campaign, from KhokKlang Village, Nong No Sub-district, Kranuan District, Khon Kean Province

Studied variables

Independent variable: Sugarcane Burning Reduction Campaign-related activities

Dependent variables:

1. Knowledge about reduction of sugarcane burning
2. Attitudes toward reduction of sugarcane burning
3. Participation in the Sugarcane Burning Reduction Campaign

Methods

Research tools

1. Posters and manuals regarding sugarcane burning reduction before transporting them to the factory
2. A knowledge test on the Sugarcane Burning Reduction Campaign
3. An attitude test towards sugarcane burning reduction
4. A form to measure participation in the Sugarcane Burning Reduction Campaign

Research procedures

The research titled "The campaign for the reduction of sugarcane burning before transporting them to the factory" was conducted through the following procedures.

1. Assessing knowledge before starting the campaign--A knowledge test on sugarcane burning reduction was employed. It is a checklist test covering 15 items, each with four choices to select. The participants' attitudes were also assessed by an evaluation form. This form was a rating scale questionnaire comprising 15 items, each with five choices to select.
2. Implementing the campaign activities through lectures, advertising posters, discussions, and data analysis based on mutual information
3. Assessing knowledge, attitude and participation of the participants after the campaign (by means of the same assessment from used before the campaign)

Data analysis

Computer program SPSS was used to analyze data as the followings:

1. Basic statistics: frequency, percentage, average and standard deviation
2. Statistics to analyze the quality of the research tools
    - 2.1 Index of Item-Objective Congruence (IOC)
    - 2.2 Item-total correlation
    - 2.3 Alpha Co-efficient
3. Paired t-test for hypothesis testing

Results

Table 1. Comparison of the mean knowledge score about sugarcane burning reduction before transporting them to the factory gained by the farmers at KhokKlang Village, Nong No Sub-district, Kranuan District, Khon Kean Province, before and after the campaign

Description	Before campaign (n=30)			After campaign (n=30)			df	t-test	P value
	$\bar{x}$	S.D.	Level	$\bar{x}$	S.D.	Level			
Know ledge (N=15)	5.73	1.63	low	11.16	1.44	high	29	-13.877	.000*

*at the significance level of.05

From Table 1, Comparison of the mean knowledge score about effective reduction of sugarcane burning before transporting them to the factory of the farmers at KhokKlang Village, Nong No Sub-district, Kranuan District, Khon Kean Province, was higher than the mean score they gained before they took part in the campaign, at the significance level of .05. This indicated that the Sugarcane Burning Reduction Campaign could help to enhance their knowledge in such area.

Table 2. Comparison of the mean attitude score towards sugarcane burning reduction before transporting them to the factory, before and after the campaign

Description	Beforecampaign (n=30)			After campaign (n=30)			df	t-test	P-value
	$\bar{x}$	S.D.	Level	$\bar{x}$	S.D.	Level			
Attitude (N=5)	3.30	0.70	not sure	4.28	0.40	agree	29	-7.218	.000*

* at the significance level of.05

As can be seen from Table 2, before the campaign, the mean attitude score towards effective reduction of sugarcane burning before transporting them to the factory of the farmers at KhokKlang Village, Nong No Sub-district, Kranuan District, Khon Kean Province, was 3.30. This figure was considered to be the "not sure" level. After the campaign, their mean attitude score rose up to 4.28 which was considered to be at the "agree" level.

Table 3. Participation in the campaign for effective reduction of sugarcane burning before transporting to the factory

Item	Participation in sugarcane burning reduction campaign (n=30)	$\bar{x}$ (N=5)	S.D.	Level of participation
Planning				
1.	You provided information on the area's surroundings and sugarcane burning in the area	4.26	0.90	highest
2.	You decided on your own to join the Sugarcane Burning Reduction Campaign.	3.96	0.92	high
3.	You suggested an activity/activities to be included in the Sugarcane Burning Reduction Campaign.	4.00	1.11	high
Total		**4.07**	**0.80**	**high**
Implementation				
4.	You helped with the preparation of the venue/equipment for this campaign.	4.20	0.99	high
5.	You helped in preparing sugarcane samples (i.e., raw sugarcane, burnt sugarcane) to be used in this campaign.	4.03	0.99	high
6.	You took part in setting up the committee to look after the environment in the community.	4.26	0.90	highest
Total		**4.16**	**0.76**	**high**
Activity participation				
7.	You took part in the Sugarcane Burning Reduction Campaign-related activities.	4.23	0.93	highest
8.	You gave an opinion(s) on causes, effects and solutions to problems associated with sugarcane field burning.	4.20	0.96	high
9.	You gave an opinion(s) on how to organize the Sugarcane Burning Reduction Campaign.	4.10	1.02	high
Total		**4.17**	**0.73**	**high**

According to Table 3, the mean score for participation in Sugarcane Burning Reduction Campaign-related activities obtained by the farmers at KhokKlang Village, Nong No Sub-district, Kranuan District, Khon Kean Province was 4.18. Overall, this was considered to be at the "high" level. Based on the consideration of each item, it was found that the item with the highest mean score was Item 12 (You have passed on the knowledge gained from the training program to you neighbors. On the other hand, the item with the lowest mean score was Item 2 (You decided on your own to join the Sugarcane Burning Reduction Campaign). Based on the consideration of each aspect, the aspect with the highest mean score was Monitoring and Evaluation while the aspect with the lowest mean score was planning.

Summary and Discussion

In terms of comparison of knowledge about effective reduction of sugarcane burning before transporting them to the factory of the farmers at KhokKlang Community, Nong No Sub-district, Kranuan District, Khon Kean Province, it was found that their mean knowledge score before the campaign was 5.73, and 11.16 after the campaign. This was due to a wide range of techniques such as lectures or Q&A used by the researcher to make it easier for the participants to understand the campaign process. That is, during the lecture, the participants/audience could feel free to ask questions when they didn't understand and they could feel free to give their opinions when engaging in discussion. Moreover, there were some recreational activities to create a fun atmosphere in order to relieve the stress of the participants. This finding was consistent with the research by Kulsuwan and others (2015) titled "The study and comparative knowledge for resource management using economics principles, attitude measurement towards environmental conservation, and skill measurement on resource management using economics principles for undergraduate students at Mahasarakham University". They found that the students learning in the class constructed on the basis of economic principles for resource management had more knowledge on resource management due to the application of economic principles, statistically significant at the .05 level. Karnpradeum (2013) conducted a research study titled "The campaign for the conservation of Burmese Padauk in NongHin Community, KhokKoh Sub-district, Muang District, Mahasarakham. Mahasarakham Province: Mahasarakham University" and the findings revealed that the participants' mean knowledge score after the training program was higher than before the mean score they obtained before they attended the training program, at the significance level of .05. The results of the present study showed that the farmers' knowledge was enhanced after they had joined the campaign for effective reduction of sugarcane burning before transporting them to the factory.

In terms of comparison of the attitudes of the farmers in KhokKlang Community, Nong No Sub-district, Kranuan District, Khon Kean Province before and after the campaign, it was found that their mean attitude score before the campaign was 3.30, and it increased to 4.28 after the completion of the campaign.This was due to a wide range of techniques such as lectures or Q&A used by the researcher to make it easier for the participants to understand the campaign process. That is, during the lecture, the participants/audience could feel free to ask questions. Moreover, there were some recreational activities to create a fun atmosphere in order to relieve the stress of the participants. These

findings were consistent with the idea proposed by Singseewo (2011). He defined "environment education" as an educational process to encourage people to realize the importance of natural resources and environment, and also to make them understand the relationship between humans and the environment. This could be viewed as a fundamental tool to improve attitude, raise awareness and enhance decision-making skills related to environmental issues, as well as to promote good environmental ethics and active participation in environmental conservation. According to Wongchantra (2015), the expression of attitude is initiated upon the decision on or evaluation of something. Such expression depends upon prior knowledge, experience and interpersonal behavior, each of which acts as a tool to help in evaluating or assessing value of something or some idea before making a decision or expressing an opinion to support that particular idea.This was consistent with the research "The campaign against the use of chemicals in vegetables at Srivilai Village, NongPling Sub-district, Muang District, Mahasarakham. Mahasarakham Province: Mahasarakham University" conducted by Toryo (2013) which revealed that after the campaign the mean attitude score of the villagers was higher than before the mean score gained before the campaign, at the significance level of .05. In addition, Chuenghom carried out a research study titled "The Campaign of Native Plants Preservation for Environmental Conservation for Youths in Roi-Et Province". The findings revealed that the youths attending the training program concerning conservation of forests and local plants obtained the mean attitude score which was higher than that they made before taking part in the program, at the significance level of .05. The findings from the present study revealed that the campaign for effective reduction of sugarcane burning before transporting them to the factory helped to improve the farmers' attitudes, too.

In terms of participation in Sugarcane Burning Reduction Campaign-related activities of KhokKlang Community, Nong No Sub-district, Kranuan District, Khon Kean Province, after the campaign their mean participation score was 4.18.This was due to a wide range of techniques such as lectures or Q&A used by the researcher to make it easier for the participants to understand the campaign process. That is, during the lecture, the participants/audience could feel free to ask questions when they didn't understand and they could feel free to give their opinions through discussion. These findings were consistent with the idea of Thatthong (2004). He mentioned that "environmental education" could be viewed as a process that aimed to enable individuals to realize the importance and understand the relationship between humans and the environment. Such understanding could lead to good attitude, awareness and environmental responsibility. Pawuttinun (1998) stated that "participation" occurred when individuals or groups of people or organizations or the general

public volunteered to take part in decision making or evaluation of a certain project for the sake of the community members, without any rules or interference from the third party. Her idea is consistent with the research by Namueangrak and Wongchantra (2015) titled "The Campaign for Fishery Resource Conservation in Ubolrat Dam Reservoir Khonkean Province" which indicated that the fishermen's participation was at the "high" level. Besides, the research titled "The campaign for the promotion of Sadao planting in order to preserve Thai herbs and local herbs using in Don Nong School, Khamraing Sub-district, Kantarawichai District, Mahasarakham Province" conducted by Oodsanoi(2014) showed that fifteen days after the campaign the students' participation was still at the "high" level, and this finding was consistent with the finding of the present study which found that the farmers' participation was at the "high" level after they took part in the campaign for effective reduction of sugarcane burning before transporting them to the factory.

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