



Environmental Impact Assessment and Quality of Life of Communities around Landfill Site: A Case Study of Tha Pho Sub-district, Muang District, Phitsanulok Province

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Abstract

The research aims to assess the positive and negative environmental and life quality (physical, mental and social health impacts) impacts of communities around landfill site of Tha Pho Sub-district, Muang district, Phitsanulok Province. The random representative samples of 228 affected representatives from 8,657 households were investigated. A questionnaire was used as a data collection instrument. The results showed that most people expressed the opinion that the current environment, physical health, mental health and social health in community were the same as in the past five years, 46.10%, 44.30%, 82.00% and 79.20%, respectively. The overview of negative impacts was at low level, with the highest negative impact on physical health ($\bar{X} = 1.33 \pm 0.17$), followed by mental health impact ($\bar{X} = 1.12 \pm 0.56$) and economic and social impact ($\bar{X} = 1.09 \pm 0.19$), respectively. For the overview of positive impacts was at medium level, people were most positively affected by economically and socially impact ($\bar{X} = 1.89 \pm 0.23$), mental health impact ($\bar{X} = 1.86 \pm 0.82$) and physical health impact ($\bar{X} = 1.68 \pm 0.19$), respectively. The data was intended to be a resource for the guideline on developing community and managing solid waste. The Phitsanulok Municipality should increase the control and prevention plan of those problems in order to reduce the potential environmental impacts and life quality in communities around landfill site in the future.

Keywords: Health Impact Assessment, Quality of Life of Community, Quality of Life, Landfills Site, Solid Waste

Introduction

Thai society has been developed rapidly in terms of economics and industry, as well as up-to-date innovative technology that facilitates and meets the need of the people. The increasing population causes the increasing demand for using estates for consumer goods and residence. This is an important cause of wastes from the overuse of plastic, cans, food containers, foams, etc. (Pintamu, 2013). According to the national survey of garbage, it is found that the garbage in community in 2016 was about 27.04 million tons (about 74,073 a day). Currently, a Thai person creates garbage at an average of 1.14 kilograms per person per day. With the current management of 7,777 nationwide local governments, there are 7,545 areas that provide the garbage elimination of 13.6 million tons (50 percent of the waste). 9.59 of the garbage are correctly eliminated (36 percent), and 11.69 million tons are incorrectly eliminated (43 percent). 5.76 million tons of the garbage are separated for beneficial use (21 percent) (Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment, 2017). Therefore, in Thailand, the complaint about the stink from garbage is, at the top, 39 percent: followed by dust and smoke problem for 23 percent: noise and disturbance sound for 17 percent. This relates to the information in 2013 indicating that the garbage complaint has been increased for 20 topics (Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment, 2017). According to the environmental problems, this can make the environment in the community deteriorated, and the problems needs to be fixed as



soon as possible. For the area used as landfills in Phitsanulok, presently, Phitsanulok City Municipality is responsible for providing garbage elimination by landfilling that garbage. Formerly, there were old landfill sites located in Bung Kok, Bang Rakum. Nevertheless, the sites are now closed, and the elimination have not been operated since 2015. According to the garbage survey of Environment Office Region 3 correspondent with 102 local governments, it is found that there are 862.33 tons of garbage per a day as 37 local government organizations have provided garbage collection and transportation. Daily, there are 484.93 million tons of garbage which are taken to get eliminated for 294.96 per a day, and to get beneficial use 159.92 tons a day. The other 65 local government organizations have not provided the services. There are 377.39 tons of garbage a day. 357.46 per a day tons are not correctly eliminated. 19.93 tons per a day are used beneficially. In Phitsanulok areas, the local government organizations can use the garbage beneficially for 198.82 tons a day, and as mentioned in the survey, there are accumulated garbage for 24,376.00 tons (Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment, 2017). In 2013, there were garbage trucks from 20 Sub-district Administration Organizations in Phitsanulok dumping garbage at Wang Nam Khu located near the Irrigation Project Khlong Mae Thiap. Local government organizations claimed that they had not enough budget to eliminate the garbage, so they used the illegal elimination service with yearly payment. The people in Ban Phai Long Moo 7 in Wang Nam Khu sub-district had been affected and complained on 24 January 2013 that the landfill site belonged to the authority who dumped the garbage wrongfully created so much trouble to them. It stank and was near water source and the small irrigation project in the middle of Khlong Mae Thiap. Later on, on 4 February 2013, it was informed that the landfill site was closed down and adjusted according to Laws for the disposal of garbage section 19, Public Health Act 1992 (Posttoday, 2013). This leads the related organizations to provide new landfill areas for garbage in order to cope with the overflow of garbage (Phitsanulok Hotnews, 2014). From 2014 to the present, Cherd Krompuk, the owner of the landfill site, has opened seven garbage elimination sites for municipalities:

1. Phlai Chumphon Subdistrict Municipality (garbage amount 7.26 tons/day)
2. Hua Ro Subdistrict Municipality (garbage amount 21.71 tons/day)
3. Ban Khlong Subdistrict Municipality (garbage amount 13.38 tons/day)
4. Khao Samo Khae Subdistrict Administrative Organization (waste amount 2.80 tons/day)
5. Bueng Phra Subdistrict Administrative Organization (garbage amount 0.4 tons/day) (Boonjun and Phetphum 2018)
6. Ta Thong Subdistrict Administrative Organization (garbage amount 9.0 tons/day) (Sopontammarak, 2016; Phitsanulok Municipality, n.d.)
7. Wat Chan Subdistrict Administrative Organization (garbage amount 20.00 tons/day) (P. memak, interviewed, March 17, 2017).

Each organization have provided garbage collection and transportation out of households for more than 10 garbage trucks a day, totally 50 tons a day. The garbage is taken to be eliminated in 6-acre landfill sites located in Moo 11 Tha Po, Meung district, Phitsanulok (Phitsanulok Municipality, n.d.). The rapid increase of population causes the environmental and natural problems in the area, such as soil, water, air, garbage, pollution, and sewage. Moreover, surrounding the landfill site, it is located near rice farm and surface and underground water sources, which can pollute the water and spread toxicities namely heavy metal into the farm and water sources (Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment, 2017). This badly affects the wellbeing of the people in the area concerning environmental and health problems (Jayangakula, 2012).



The landfill site is also one kilometre near the temple and Ban Pong Mokhao School causing stench to the people in community. The elimination process is not in accordance with the designed academic method and can cause environmental problems in the future (Satidworahiru, Sarin and Glomjek, 2014). This can impact on the toxicity spread to the nature and affect people’s health living near the site (Srikuta and Inmuong, 2011). However, to prevent the health problem, it is necessary to evaluate and asses the health effect of the people. This can be seen as a suitable tool to administer the health risk and accepted internationally. It is taken to create the social learning process between people, governmental officials, and private sections, in order to learn about the consequence of those activities and impact predictions of the change that will happen or has happened by the garbage landfilling. This is to be the approach for policy decision in eliminating garbage with the most correct way. Therefore, to achieve the goal, it is interesting to provide the health assessment tool for administrating health risk of the people, employ it as an objective to assess the positive and negative environmental impact and wellbeing concerning physical health, mental health, economy, and community of the people around the site in Tha Po, Mueng district, Phitsanulok. This will be set as the base knowledge for other related organizations in order to plan protection policies, reduce negative impact to the environment, as well as to set an alert guidance for supporting and protecting people’s health in the community, aiming to have a better and healthier life forward.

Research Methodology

This research covers the environmental impact as well as positive and negative wellbeing of physical health, mental health, economy, and community. The form of this research is conducted by employing Cross-Section Descriptive Study. The research methodologies are as follows:

Population and Samples

The population in this study is the representative household of 8,657 from 23 villages living in the community that comments on the health impacts around the landfill sites in Tha Pho subdistrict, Mueng district, Phitsanulok within five kilometers. The villages are as follows: Ban Don and Ban Na Pho Daeng located in Wat Chan subdistrict: Ban Wang Kum located in Bang Rakam subdistrict: Ban Tha Pho, Ban Wang Som Sa, Ban Wang Won, Ban Khlong Khu, Ban Yang, Ban Yang En, Ban Khaek, Ban Khlong Nong Lek, Ban Huai Krathing, Ban Nai Rai located in Tha Pho subdistrict: Ban Tha Thong, Ban Kok, Ban Chula, Ban Tha Thong Ook, Ban Choong Nang, Ban Tha Thong Tok, Ban Rai, Ban Nong Hua Yang, Ban Wang Krabak, Ban Ton Wa located in Tha Pho subdistrict, Mueng district, Phitsanulok (Community Development Department, Ministry of Interior, 2016; Thathong Subdistrict Municipality, n.d.) (Table 1).

Table 1 Populations and Sample Group Used for Research

	Village Name	Subdistrict	Population (Household)
1.	Ban Wang Somsa	Tha Pho	174
2.	Ban Wang Somsa	Tha Pho	250
3.	Ban Wang Won	Tha Pho	332
4.	Ban Khlong Khu	Tha Pho	150
5.	Ban Yang	Tha Pho	293
6.	Ban Yang En	Tha Pho	250
7.	Ban Tha Pho	Tha Pho	419
8.	Ban Khaek	Tha Pho	372



Table 1 (Cont.)

	Village Name	Subdistrict	Population (Household)
9.	Ban Khlong Nong Lek	Tha Pho	138
10.	Ban Huai Krathing	Tha Pho	134
11.	Ban ni rai	Tha Pho	104
12.	Ban Wang Kum	Bang Rakam	283
13.	Ban Choong Nang	Tha Thong	349
14.	Ban Kok	Tha Thong	905
15.	Ban Cula	Tha Thong	978
16.	Ban Tha Thong Tok	Tha Thong	462
17.	Ban Tha Thong xxk	Tha Thong	460
18.	Ban Nong Hua Yang	Tha Thong	337
19.	Ban Wang Krabak	Tha Thong	667
20.	Ban Ton Wa	Tha Thong	222
21.	Ban Don	Wat Chan	940
22.	Ban Na Pho Daeng	Wat Chan	171
23.	Ban Pong Mo khaow	Tha Nang Ngam	267

The samples in this study are representatives of each households living in the community around the landfill sites. The sample size can be calculated from the formula to estimate the population average rate as follows (Chirawatkul, 2005):

$$n = \frac{[NZ_{\alpha/2}^2 \sigma^2]}{[e^2(N-1) + Z_{\alpha/2}^2 \sigma^2]}$$

n = Sample size (People)

N = Number of population in the study (8,657 individuals)

σ^2 = Variance of variable used to calculate sample size (equal to 0.51^2)

e = Compactness of estimation (This study requires that not more than 2% of the average value is 0.51)

$Z_{\alpha/2}^2$ = The determined confidence rate for 95% at the statistical significance level which Z is at the statistical significance level. α equals to 0.05 (Thus $Z_{\alpha/2}^2$ equals to 1.96)

This research employed the means variable of the impact on quality of life. Generally, according to the study of the impact of garbage elimination in landfill sites of Roi Et Municipality on quality of life of the people living nearby, it found that the average effect on overall quality of life was 3.27 ± 0.51 . Thus, the variance of overall variable of the impact on quality of life (σ^2) was (0.51^2) by determining the compactness (e) at 2% of the means of the overall impact on quality of life (Buatongjun, 2007). From the above formula, it resulted in the sample size of 228 people from the population of 8,657 households (Thapho Subdistrict Administrative Organization, n.d.). Then, the stratified random sampling was performed (Lapkom and Inmuong, 2011). By random using the survey questionnaire, each representative of each household who was more than 18 and physically affected by the landfill site would be given the survey questionnaire to be randomized. The random was conducted by drawing home numbers of each village without putting them back according to the defined household ratio (Srikuta and Inmuong, 2011). The samples in each sub district were 100 in Tha Pho, 8 in Bang Rakam, 87 in Tha Thong, 23 in Wad Chan, and 10 in Tha Nanngam.



Tools and Quality Inspection

The tools used in data collection was the questionnaire covering the content concerning the environmental and the impact on the quality of life of the people near the landfill sites, as well as to listen suggestions for future adjustment. The tool for data collection was constructed according to the following processes:

1. Concepts, theories, documents, and related research were studied.
2. The construction processes were divided into three parts: the first was personal information of the answerer, the second was environment information in the community, the third was information about quality of life of the people in the community.
3. To provide the tool inspection, the questionnaire was presented before 3 professionals to verify the concordance between questions and objectives and questionnaire (Index of Item Objective Congruence: IOC). The validity must be between 0.50–1.00 for practical use. Later on, 30 questionnaires were tested by the samples for finding out reliability by conducting Cornbach's Alpha Method. This study received reliability more than 0.86 which was considered suitable as a tool to collect data.

Data Collection

The data collection in this study was conducted by employing qualified questionnaires and sending to the samples. When receiving the questionnaires, they were in process of verification and qualification of valid data. Then, the researchers took them to analyze by using SPSS program.

Data Analysis and Statistics

The descriptive statistics was used in the study by conducting the statistics program to analyze general data and the data of the impact on quality of life concerning physical health, mental health, economy, and community. The data analysis of the impact on people's quality of life was conducted by employing frequency, ratio, percentage, means and standard deviation. The impact level of environment and quality of life was analyzed and interpreted into means. The means of class intervals size could be calculated from the highest score minus the lowest score and dividing it with the number of classes by using Buatongjun's rating scale analysis (2007). The impact level was divided in to three levels: means between 2.34–3.00 meant that the people in the community got considerable impact: means between 1.67–2.33 meant that the people in the community got average impact: and means between 1.00–1.66 meant that the people in the community got slight impact.

Research Results

The research results were divided into three parts: the first was personal information of the answerer; the second was environment information in the community; and the third is information about quality of life of the people in the community. The details of the result were as follows:

1. Personal Information of the Answerers

The samples were 228 men, calculated as 57.9%, there were 42.1% of women. Most of them were Buddhist, calculated as 100%. The age was between 41–50, calculated as 56.6%. The next was between 31–40, calculated as 35.1%. The last was between 50–60, calculated as 3.9% respectively. Most of them were representatives of their households. They were mostly in marital relationship, calculated as 61.4%, followed by divorce relationship for 21.9 and single relationship for 16.7. Most of the sample got education level in secondary school for 31.1%, followed by primary school for 25.9%, high school for 25.4%, diploma for 10.5%, undergraduate for 3.9%, and no education level for 3.1%. The main vocations of the samples were private business



for 40.4%, followed by agriculture for 29.4%, students for 11.8%, civil servants for 6.6%, retired/unemployed for 4.4, private employee for 3.9%, and unemployed for 3.5%. The most income per month was between 10,001 – 15,000 baht/month or 39.9%, followed by 5,001–10,000 baht/month or 28.1%, between 15,001–20,000 baht/month or 19.3%, between 20,001–25,000 baht/month or 7.5%, and below 5,000 baht/month or 5.3%. The residence was mostly single house for 66.7, followed by convenience store for 23.2%, and restaurant for 10.1%. Most of the samples were descendant from their forefathers for 78.1%, and migrated from other places for 21.9%. 17.1 of them migrated less than 10 years, and only 4.8% migrated more than 10 years. All of the samples never thought of moving their residence out. Most of them had congenital diseases. 55.7 of the diseases was heart disease, followed by diabetes for 11.0%, and hypertension for 27.2%. (Table 2)

Table 2 Personal Information of Respondents

Personal Information		Percentage
1. Gender		
	Male	57.9
	Female	42.1
2. Religion		
	Buddhism	100.0
3. Age (years)		
	≤ 20	0.0
	21 – 30	4.4
	31 – 40	35.1
	41 – 50	56.6
	51 – 60	3.9
	> 60	0.0
4. Status		
	Married	61.4
	Widowed / Divorced / Separated	21.9
	Single	16.7
5. Education Level		
	Junior High School	31.1
	Primary School	25.9
	Senior High School	25.4
	Diploma / Equivalent	10.5
	Bachelor	3.9
	Uneducated	3.1
6. Occupation		
	Private Business	40.4
	Agriculturist	29.4
	Student / Collegian	11.8
	Civil Servants	6.6
	Retired	4.4
	Private Employees	3.9
	Unemployed	3.5



Table 2 (Cont.)

Personal information		Percentage
7. Personal Income Per Month		
< 5,000		5.3
5,001 – 10,000		28.1
10,001 – 15,000		39.9
15,001 – 20,000		19.3
20,001 – 25,000		7.5
8. Housing Characteristics		
Single house		66.7
Convenience Store		23.2
Restaurant		10.1
9. How Long does your Household Live in this Community?		
Since the Ancestors		78.1
Moved from Another Place		21.9
10. Thinking of Moving to Live / Work Elsewhere		
Moved from another place lower than 10 year		17.1
Moved from another place more than 10 year		4.8
11. Having a Disease		
Congenital Disease		55.7
Heart Disease		17.5
Diabetes		11.0
Hypertension		27.2

2. Environment Information in the Community

Compared to five years ago, the environmental impact from the landfill site in the community was the same for 46.10%, followed by the better environment for 43.00%, and the worse for 11.00%. The overall image faced less environmental problem ($\bar{x} = 1.32 \pm 0.80$). When considering the respective order, it found that the dimension that faced with middle level of problem was garbage/sewage in the community ($\bar{x} = 1.92 \pm 1.38$). The low level of problem was polluted water from garbage ($\bar{x} = 1.51 \pm 1.13$), followed by air pollution ($\bar{x} = 1.36 \pm 0.83$), unattractive landscape ($\bar{x} = 1.36 \pm 0.93$), noises from vehicles ($\bar{x} = 1.16 \pm 0.67$), contagion ($\bar{x} = 1.12 \pm 0.58$), traffic flexibility ($\bar{x} = 1.11 \pm 0.55$), and deteriorated soil ($\bar{x} = 1.03 \pm 0.28$). It was seen that the environmental assessment of the people living around the landfill site was still at fine level. It was because most people were not affected from the soil deterioration problem for 99.1%, and only 0.90 of them were affected. Followed by the traffic flexibility for 96.5, only 3.50% of them were affected. In addition, 96.10 of them were affected by the contagion problem, and only 3.60% of them were affected by stray animal problem. (Table 3)

Table 3 Environment of the Community around the Landfill Site

Impact on Environment	No Impact Taken (%)	Impact Taken			$(\bar{x} \pm S.D)$	Level
		Impact Level (%)				
		High	Medium	Low		
Unpleasant Landscape	86.40	-	4.40	9.20	1.36 ± 0.93	Low
Garbage / Sewage	69.30	-	-	30.70	1.92 ± 1.38	Medium
Air Pollution	82.50	3.90	8.80	4.80	1.36 ± 0.83	Low
Drainage	87.70	-	4.40	7.90	1.32 ± 0.88	Low



Table 3 (Cont.)

Impact on Environment	No Impact Taken (%)	Impact Taken			$(\bar{X} \pm S.D)$	Level
		Impact Level (%)				
		High	Medium	Low		
Water Pollution from Garbage	82.90	-	-	17.10	1.51 ± 1.13	Low
Irritating Noises	94.70	-	-	5.30	1.16 ± 0.67	Low
Soil Deterioration	99.10	-	-	0.90	1.03 ± 0.28	Low
Contagion	96.10	-	-	3.60	1.12 ± 0.58	Low
Traffic Flexibility	96.50	-	-	3.50	1.11 ± 0.55	Low
The Overall Image of the Impact on Environmental Problems					1.32 ± 0.80	Low

3. Information about Quality of Life of the People in the Community

3.1 Physical Health

According to the answers of the samples, most of the people saw that their physical health, compared to the last 5–10 years, was the same. It could be calculated as 44.3%, followed by better health for 42.5%, and worse health for 13.2%. It could be seen that the overall image of the negative impact on physical health was at low level ($\bar{X} = 1.53 \pm 0.18$). When considering the negative impact on physical health respectively, it was found that there were contagious diseases in the community such as skin disease, conjunctivitis, and diarrhea, which was the most impact comparing to other dimensions. It was at the low level of 33.80% ($\bar{X} = 1.46 \pm 0.70$), followed by the stink from the landfill site in the community causing headache, nausea, and vomiting for 11.80 at low level ($\bar{X} = 1.36 \pm 0.97$), and dust/smoke causing respiratory diseases causing allergy, flu, and pneumonia for 6.60% at low level ($\bar{X} = 1.17 \pm 0.66$). However, according to the attitude inquiry of the people in community in which not affected by the landfill site, there were at equal 100%. In term of community, there were no bugs or infectious animal causing diseases in the community. Also, there was no significant impact on environmental problems in the community causing rash or dermatitis, nor accidents or sickness from any sharp garbage.

Regarding the overall positive physical impact, people in the community were positively affected sorted at the middle level ($\bar{X} = 1.68 \pm 0.19$), and when considering the positive impact on physical health respectively, it found that the people were satisfied with health survive they received. It could be calculated as 40.00 at low level ($\bar{X} = 1.46 \pm 0.70$), followed by environmental pollution concerning sickness of family members for 33.80% at low level ($\bar{X} = 2.35 \pm 0.72$), usual health check when there was a care unit provided for 15.00% at low level ($\bar{X} = 1.60 \pm 0.51$), and opinion about occurrence of new diseases for 10.10 at low level ($\bar{X} = 1.30 \pm 0.91$), respectively. However, it was indicated that the people were not affected by the treatment from health service station/medical facility for 100% (Table 4).



Table 4 Opinion about the Quality of Life Concerning Physical Health

The Impact on the Quality of Life Concerning Physical Health	Impact Taken			$(\bar{X} \pm S.D)$	Level
	No Impact Taken (%)	Impact Level (%)			
		High	Medium		
Negative Impact					
1. Your community is the source of insects and diseases, which cause various diseases in the community.	100.00	-	-	-	-
2. The disturbing smell makes you feel headache, nausea, vomiting etc.	88.20	-	-	11.80	1.36 ± 0.97 Low
3. Dust/smoke causes you to suffer from respiratory illnesses such as allergies, flu, pneumonia, etc.	93.40	-	2.70	3.90	1.17 ± 0.66 Low
4. Environmental problems in your community cause rashes, skin inflammation, etc.	100.00	-	-	-	-
5. Your community occurred an accident or illness from sharp waste.	100.00	-	-	-	-
6. You think that epidemics always occur in community such as skin diseases, conjunctivitis, diarrhea, etc.	66.20	-	21.00	11.80	1.46 ± 0.70 Low
The Overall Image of the Negative Impact on Quality of Life Concerning Physical Health				1.33 ± 0.17	Low
Positive Impact					
1. You have received more treatment from the health center/healthcare facility.	100.00	-	-	-	-
2. You are satisfied with the health service system you receive.	60.00	-	10.00	30.00	1.46 ± 0.70 Low
3. You receive regular medical examinations from the examination unit.	85.00	-	-	15.00	1.60 ± 0.51 Low
4. Environmental pollution problems are related to the illness of members of your household.	66.20	-	21.09	12.71	2.35 ± 0.72 Medium
5. You think that there might be new diseases that never happened before.	89.50	-	-	10.10	1.30 ± 0.91 Low
The Overall Image of the Positive Impact on Quality of Life Concerning Physical Health				1.68 ± 0.19	Medium
The Overall Image of the Positive and Negative Impact on Quality of Life Concerning Physical Health				1.53 ± 0.18	Low

3.2 Mental Health

According to the answers of the samples, most of the people saw that their physical health, compared to the last 5–10 years, was the same. It could be calculated as 82.0%, followed by better mental health for 14.9%, and worse health for 3.1%. It could be seen that the overall image of the positive and negative impact on mental health was at low level ($\bar{X} = 1.45 \pm 0.69$). When considering positive and negative impact separately, the result was that the overall negative impact on mental health was at low level ($\bar{X} = 1.12 \pm 0.56$). When considering the taken impact respectively from the negative to positive, it revealed that people were irritated by bugs, mosquitoes, and cockroaches in the community that annoyed the daily life of the people. It could be calculated



as 10.50% ($\bar{x} = 1.00$), followed by the satisfaction of the garbage flow in the housing residence for 5.70 at low level ($\bar{x} = 1.15 \pm 0.64$), the irritation of bad stink in the community for 3.90% at low level ($\bar{x} = 1.12 \pm 0.56$), the concern about the present residence for 3.50 at low level ($\bar{x} = 1.07 \pm 0.40$), and the concern about the toxicities spread into the farming sections for 12.30 at low level ($\bar{x} = 1.25 \pm 0.66$) respectively. However, it was indicated that the people were not affected by the landfill sites in terms of consuming dimension for 100% such as the concern about the surface water source for consumption.

For the positive mental health, it was at middle level ($\bar{x} = 1.86 \pm 0.82$). When considering the impact respectively, to have the landfill site nearby the community, people were still content to live in the area. It could be calculated as 87.90 at middle level ($\bar{x} = 2.25 \pm 0.44$), followed by the satisfaction of the pollution solution of each organizations for 86.40 at low level ($\bar{x} = 1.50 \pm 0.99$), the satisfaction of the traffic in the community for 80.50 at middle level ($\bar{x} = 1.90 \pm 0.80$), and the satisfaction of health care from the local governmental organization for 74.50 at low level ($\bar{x} = 1.80 \pm 0.95$) (Table 5).

Table 5 Opinion about the Quality of Life Concerning Mental Health

The Impact on the Quality of Life Concerning Mental Health	Impact Taken			$(\bar{x} \pm S.D)$	Level	
	No Impact Taken (%)	Impact Level (%)				
		High	Medium			Low
Negative Impact						
1. You feel irritated and annoyed to get a bad smell in your community.	96.10	-	0.90	3.00	1.12 \pm 0.56	Low
2. You are not satisfied with the grabage blown into your residence.	94.30	-	1.80	3.90	1.15 \pm 0.64	Low
3. You are annoyed with the flies, mosquitoes, cockroaches interfering your daily life.	89.50	-	-	10.50	1.00	Low
4. You feel concerned if you have to use surface water for consumption.	100.00	-	-	-	-	-
5. You fell concerned about your current residence.	96.50	-	3.10	0.40	1.07 \pm 0.40	Low
6. You feel concerned that pollution in the community would affect agriculture.	87.70	-	12.30	-	1.25 \pm 0.66	Low
The Overall Image of the Negative Impact on Quality of Life Concerning Mental Health					1.12 \pm 0.56	Low
Positive Impact						
1. You are content living in your community.	12.10	77.80	10.10	-	2.25 \pm 0.44	Medium
2. You feel comfortable with transportation in the community.	19.50	46.80	22.30	11.40	1.90 \pm 0.80	Medium
3. You are satisfied with the solution of pollution problems in the community from various agencies.	13.60	67.50	11.40	7.50	1.50 \pm 0.99	Low
4. You are satisfied with the medical welfare of the municipal authorities.	25.50	40.30	26.30	7.90	1.80 \pm 0.95	Medium
The Overall Image of the Positive Impact on Quality of Life Concerning Physical Health					1.86 \pm 0.82	Medium
The Overall Image of the Positive and Negative Impact on Quality of Life Concerning Mental Health					1.45 \pm 0.69	Low



3.3 Economy and Society

According to the answers of the samples, most of the people saw that their physical health, compared to the last 5–10 years, was the same. It could be calculated as 79.2%, followed by better mental health for 18.8%, and worse health for 2.0%. It could be seen that the overall image of the positive and negative impact on mental health was at low level ($\bar{x} = 1.44 \pm 0.25$). When considering positive and negative impact separately, the result was that the overall negative impact on mental economy and society was at low level ($\bar{x} = 1.09 \pm 0.19$). Most people thought that the landfill site did not affect the estate price of the land around the site. It could be calculated as 100%. However, when considering the taken impact respectively from the negative to positive, it found that due to the landfill site location nearby the community altered the way of life of the people such as less meeting or less activity participation. It could be calculated as 25.70 at low level ($\bar{x} = 1.22 \pm 0.43$), followed by the lower overall average income for 4.70 at low level ($\bar{x} = 1.11 \pm 0.47$), the dispute due to the landfill location between people in the community and related organizations for 4.50 at low level ($\bar{x} = 1.07 \pm 0.37$), and the dispute between the people in the community for 3.90 at low level ($\bar{x} = 1.08 \pm 0.39$) respectively.

For the overall positive image of economy and society, it was at middle level ($\bar{x} = 1.89 \pm 0.23$). When considering the impact respectively, to have the landfill site nearby the community, people made a complaint about the environmental problem from the landfill site, causing people to protect their rights and community. It was calculated as 88.20 at middle level ($\bar{x} = 1.90 \pm 0.88$), followed by the unity of the people derived from the close location of the landfill site for 53.10% at middle level ($\bar{x} = 2.01 \pm 0.65$), the better community from the environmental solution of related organizations for 30.00 at low level ($\bar{x} = 1.53 \pm 1.07$), the increased part time jobs of the people due to the landfill site for 29.30 at middle level ($\bar{x} = 2.09 \pm 0.46$), and the thorough access to the information about pollution solution in the community for 78.50 at low level ($\bar{x} = 2.21 \pm 0.76$). (Table 6)

Table 6 Opinion about the Quality of Life Concerning Economy and Society

The Impact on the Quality of Life Concerning Economy and Society	Impact Taken			$(\bar{x} \pm S.D)$	Level	
	No Impact Taken (%)	Impact Level (%)				
		High	Medium			Low
Negative Impact						
1. You think that the average income within the family per person per month per year has decreased.	95.30	-	4.70	-	1.11 ± 0.47	Low
2. The estate price around the landfill site is reduced.	100.00	-	-	-	-	-
3. Landfill site is located near the community causing changes of ways of life such as less meeting or less activity participation.	74.30	-	14.20	11.50	1.10 ± 0.43	Low
4. Landfill site is located near the community causing more conflicts between people in the community.	96.10	-	-	3.90	1.08 ± 0.39	Low



Table 6 (Cont.)

The Impact on the Quality of Life Concerning Economy and Society	Impact Taken			$(\bar{X} \pm S.D)$	Level	
	No Impact Taken (%)	Impact Level (%)				
		High	Medium			Low
5. Landfill site is located near the community causing conflicts between people and related organizations.	95.50	-	4.50	-	1.07 ± 0.37	Low
The Overall Image of the Negative Impact on Quality of Life Concerning Economy and Society					1.09 ± 0.19	Low
Positive Impact						
1. If related organizations provide environmental solutions in the community, it will make the community more livable.	70.40	-	18.20	11.8	1.53 ± 1.07	Low
2. Landfill site is located near the community providing more jobs.	70.70	-	-	29.30	2.09 ± 0.46	Medium
3. Complaints about environmental problems from landfill sites lead villagers to have more roles to protect their rights and communities	11.80	64.50	22.40	1.30	1.90 ± 0.88	Medium
4. Landfill site is located near the community providing more unity of the people insolving problems.	46.90	32.00	18.00	3.10	2.01 ± 0.65	Medium
5. You have thoroughly received various news about solving environmental pollution problems in the community.	78.50	10.20	10.00	1.30	2.21 ± 0.76	Medium
The Overall Image of the Positive Impact on Quality of Life Concerning Economy and Society					1.89 ± 0.23	Medium
The Overall Image of the Positive and Negative Impact on Quality of Life Concerning Economy and Society					1.53 ± 0.25	Low

Discussion

The environmental impact on the community near the landfill site in Tha Pho subdistrict, Mueng district, Phitsanulok was mostly at low level. It depended on the current environment and location of the community. The nearest community was the most affected, so they were making complaints about the problems. However, in the present, by conducting the investigation with the people, it found that the garbage problem was at low level. It was due to well management of Phitsanulok Municipality. The results of the investigation in terms of positive and negative impact on quality of life of the people around the landfill site in Tha Pho subdistrict, Mueng district, Phitsanulok were divided into three dimensions: physical health, mental health, and economy and society. The result found that the level from most people was at low level. Related to Imnamkhao (2006), conducting the study about the quality of life of the people around the landfill site in Maha Sarakham Municipality, it was indicated that the lists of quality of life of the people around the landfill site were at low level. People were affected by, such as, smoke, contagious animal, etc. That was the main cause that lead Khon Kaen Municipality to provide new landfill site in community. Nevertheless, according to the study, it was found that the estate owner did not consent. The opposition from the community was then performed because they were concerned that there could be dangers affecting society, nature, and health as it had happened before. Consequently, Khon Kaen Municipality



was necessary to find other way such as to encourage and support the community to reduce the number of garbage; however, such policy was not effective as expected. In the near future, the Municipality then privatized the garbage to uplift its value such as changing it to gasoline. It was interesting to track down the project that how much it would solve the problem, and the participation of the people was very significant for success of the project. Nonetheless, Khon Kaen Municipality provided short-term and long-term policy to compromise the complaints since 2006. As the study of Meechamnan and Lakananuruk (2010) investigating the quality of life of the people in Nakhon Chai Si District, Nakhon Pathom, it showed that people who confronted different environmental problem had different quality of life. It was generally seen that people who confronted low environmental problem had better quality of life than ones with middle level, and people who confronted middle environmental problem had better quality of life than ones with high level. Therefore, according to the garbage management in Tha Pho, the main important factor affecting the quality of people's life depended on the current environment and community location near the landfill site and garbage management of Phitsanulok Municipality. The Municipality provided well and effective separation, transportation, and elimination system, compared to the other areas that did not manage the garbage academically which could cause more problems. As well as the garbage management in Ban Pa Tung Noi, Doi Saket District, Chiangmai, it was found that people in the community were negatively affected by several factors such as reduced greenery and wild animal, deteriorated soil, and lack of fertility causing uselessness, loud noises, stink, and an increased number of contagious germs. These badly affected people's health such as unstable emotion, anger, and stress. However, the construction of landfill site made better direction concerning positive society, helped increase jobs and income, and lead to roads and tap water (Baipo, 2013). Meanwhile, it was related to the result of Chayakul (2010) which investigated the effect of garbage management of Khlong Sam Sub District Administration Organization. It found that the garbage management area affected health and quality of environment of the people causing contaminant of soil from garbage dump and illegal dump (Laon and Munarsa, 2008). The high or low effect depended on the type of garbage and the location of the landfill site (Noinumsai and Wachirawongsakorn, 2017). That is to say, if a number of electronics garbage such as battery, fluorescence, or flashlight battery was dumped, the amount of contaminated metal such as mercury, lead, and cadmium might badly affect the quality of soil. Also, the degenerated organic substances in garbage caused soil to be acid which could affect polluted water, garbage tiding, and polluted soil nearby. Moreover, the negative impact of garbage was related to the study of Srikuta and Inmuong (2011) that had assessed the health impact of the community close to landfill site in Khon Kaen Municipality. It found that the landfill site was a germ breeding area which could spread out to the nearby area or community. As there had been a landfill site before, it created a negative impact on people's health concerning physical health, mentality, and society; for example, there was a risk of having respiratory diseases and health anxiety of their family and themselves. Furthermore, the burning elimination caused terrible trouble, irritated people, created unpleasant smell, and polluted air. The samples indicated that in the evening or after raining occurred the spiteful scent: they could feel that it came continuously at that time, including at noon. Anyway, the irritating smell depended on the distance between the landfill location and community and the operation in the landfill area. If there was digging or scooping, it might cause more unpleasant smell. The landfill site was also a source of flies and contagious animal such as rats which could cause contagious diseases. Especially in summer, it was found that the people in Ban Khun Chang confronted with a number of flies and drosophila irritating and causing trouble. Besides, it could cause health risk to children, elder, employees who worked nearby, and ones with low immunity inclining to get infected such as skin diseases, red



eye, loss of blood, etc. (Bich, Quang, Ha, Hanh, and Guha-Sapir, 2011). Therefore, to compromise the risk to people's health, the community should collect garbage in closed container and provide correct and appropriate way of elimination, along with arranging the measure to continuously track down and stay alerted to the impact on environment and quality of people's life in the community.

Conclusion

The research is the study assessing environmental and life quality impacts of communities around landfill site of Tha Phoe Sub-district, Muang district, Phitsanulok Province. The research was conducted qualitatively. According to the impact assessment in the area, it can be concluded that the garbage elimination management is quite effective, which leads to positive and negative impact on physical health, mental health, and society and economy. The people around the area see that the impact is at low level. However, the people still face with environmental problems such as garbage in the community, air pollution, water pollution, stray animal, and agricultural problem that these irritate the daily life of the people. Therefore, it is necessary for related organizations to provide protection for the environment problem that may occur by facilitating knowledge and finding solution from every related sections; meanwhile, it is important that there should be a determination concerning the continuous appropriate long-term solution to the garbage problems.

Suggestion

It is suggested to conduct more study or people's comment query around the community about landfill site location and investigate the way to compensate such damages in order to practically compromise the conflicts and apply the idea with other community.

References

- Baipo, W. (2013). Social and Environmental Impacts on Community from Integrated Waste Management Middle Zone, Pha Thung Noi Village, Doisaket District, Chiang Mai Province. *Rajabhat Chiangmai Research Journal*, 14(2), 61-71.
- Bich, T. H., Quang, L. N., Ha, L. T. T., Hanh, T. T. D., & Guha-Sapir, D. (2011). Impacts of Flood on Health: Epidemiologic Evidence from Hanoi, Vietnam. *Global Health Action*, 4(6356), 1-8. DOI: 10.3402/gha.v4i0.6356
- Boonjun, S., & Phetphum, C. (2018). Factors Affecting Behavior in Solid Waste Separation among Housewives in Bung Phra Sub District, Muang District, Phitsanulok Province. *Journal of Graduate Studies Valaya Alongkorn Rajabhat University*, 12(1), 180-190. Retrieved from <https://tci-thaijo.org/index.php/JournalGradVRU/article/view/119491>
- Buatongjun, A. (2007). *Life Quality Impacts of Communities near Roi Et Municipality's Solid Waste Disposal Site*. (Master's thesis). Mahasarakham University, Mahasarakham.



Chayakul, K. (2010). Health and Environmental Impacts from Solid Waste Management: A Case Study of Solid Waste Management of the Khlong Sam Administrative Organization in Khlong Luang Sub-District, Pathum Thani Province. *EAU Heritage Journal*, 2(1), 154-165.

Chirawatkul, A. (2005). *Biostatistics for Health Science Research* (3rd ed.). Khon Kaen: Faculty of Public Health, Khon Kaen University.

Community Development Department, Ministry of Interior. (2016). *List of Villages and Household Registration*. Retrieved from <https://apps2u.cdd.go.th/phitsanulok/bmn/2559/Quality-Life/ทะเบียนรายชื่อหมู่บ้านที่จัดเก็บ/ทะเบียนรายชื่อหมู่บ้าน-เขตชนบท.pdf>

Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment. (2017). *Open the Reports of Pollution Control Department on "Pollution 2016"; 1.9 Thousand Tons of Solid Waste Increasing, Hazardous Waste Generated for More Over 3.5 Million tons, 23% of Poor Water Resource Quality, 3 Sites of Critical Levels on Air Pollution*. Retrieved from <http://www.environnet.in.th/archives/4109>

Imnamkhao, W. (2006). *Quality of Life of the People Living Near the Waste Disposal Center of Municipal Muang Mahasarakham*. (Master's thesis). Khon Kaen University, Khon Kaen.

Jayangakula, K. (2012). Health and Environmental Impacts from Solid Waste Management: A Case Study of the Solid Waste Management of the Khlong Sam Administrative Organization in Khlong Luang Sub-District, Pathum Thani Province. *EAU Heritage Journal Social Science and Humanities*, 2(1), 154-165.

Laon, S., & Munarsa, A. (2008). *Awareness Training Workshop on Children's for Waste Disposal at Wat Thammongkol in Child Development Center*. Bangkok: Suan Sunandha Rajabhat University.

Lapkom, C., & Inmuong, U. (2011). Water Quality and Perception of the Population about Water Pollution Problems at Communities near the Landfill Site of the Khon Kaen Municipality, Khon Kaen Province. *KKU Journal for Public Health Research (KKU-JPHR)*, 4(3), 51-62.

Meechamnan, S., & Lakananuruk, S. (2010). Quality of Life of People in Nakhonchaisri District Nakhon Pathom Province. *Silpakorn Educational Research Journal*, 1(2), 269-281.

Noinumsai, S., & Wachirawongsakorn, P. (2017). The Assessment of Suitable Sanitary Landfills Area in Uttaradit Province by Using Geographic Information System. *Naresuan University Journal: Science and Technology*, 25(3), 77-88.

Phitsanulok Hotnews. (2014). *Chief Executive of Provincial Administrative Organization Inspected Private Landfill*. Retrieved from <http://www.phitsanulokhotnews.com/2014/02/28/49347>.

Phitsanulok Municipality. (n.d.). *Management of Solid Waste in Phitsanulok District, Phitsanulok Province*. Retrieved from http://www.reo3.go.th/newversion/images/stories/report2557/report_env_2556/33.pdf



Pintamu, D. (2013). Municipal Solid Waste Management by People's Participation of Bansok Sub-District Administration Organization, Lomsak District, Phetchabun Province. *Phetchabun Rajabhat Journal*, 15(2), 16-24. Retrieved from http://research.pcru.ac.th/journal_pcru/index.php/re/article/view/154/151

Posttoday. (2013, January 24). *The Regional News of the Rubbish Litter of Influencers Smelly*. Retrieved from <https://www.posttoday.com/social/local/200864>

Satidworahiru, K., Sarin, J., & Glomjek, P. (2014). Solid Waste Management System for Thapho Sub-District Administrative Organization, Muang, Phitsanulok. In *Proceedings of Interdisciplinary Research and Studies, 5 August 2017* (pp. 225-231). Kamphaeng Phet: n.p.

Srikuta, P., & Inmuong, U. (2011). Health Impact of Landfill Sites on Communities near by - a Study at Khon Kaen Municipality, Khon Kaen. *KKU Journal for Public Health Research (KKU-JPHR)*, 4(2), 9-20.

Sopontammarak, A. (2016, May 25). "The People of Tha Thong" To Solve Waste Problem. Retrieved from <http://www.thaihealth.or.th/Content/31461-หมุน%20%60ชาวบ้านต.ท่าทอง%60%20แก้ปัญหาขยะ.html>

Thapho Subdistrict Administrative Organization. (n.d.). *Thapho Subdistrict Administrative Organization's General Conditions*. Retrieved from <http://www.thapho.go.th/condition.php>

Thathong Subdistrict Municipality. (n.d.). *Administrative Region*. Retrieved from <http://www.thathong-pilok.go.th/condition.php>