



Effect of Swine Farming on Soil Quality at Thung Khai,  
Yan Ta Khao, Trang Province.

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**Title** : Effect of swine farming on soil quality at Thung Khai , Yan Ta Khao,  
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### **Abstract**

Effect of swine farming on soil quality is to study the differences between soil types affect soil quality. Two study areas, the soil within the swine farm and the soil nearby, were determined by studying the physical characteristics of the soil, moisture, temperature, acidity-base, and nutrients of the soil, which are indicators of soil quality in each study site. Moisture and temperature were measured from the study area and soil samples that were collected from both areas to study nutrients and acidity. Soil base used HI3895 soil test kit The study found that the physical characteristics of the soil humidity acidity, base and nutrients of the soil around the swine farm with the near area. The soil in the swine farm has moisture = 3.5, temperature =  $35\pm 1$  °C and pH = 5.33 respectively, and nearby soils have moisture = 4 , temperature =  $38\pm 1$ °C and pH = 6.67, respectively. Soil nutrients overall, the soil around the swine farm contains more nutrients than the nearby ones. This research can be used to further develop the application of soil to make fertilizer. Agriculture is another option to use the soil from the swine farm to create jobs for people in the community, and If there is an opportunity, the organizer would like to study how to make the soil from the swine farm not to smell unpleasant as well.

**Keywords** : *Soil , swine farm , Physical characteristics of soil*

## Introduction

The swine farming is an occupation in which most people in highland communities raise pigs for consumption as a source of protein and sell them as an additional income by eating food scraps, agricultural wastes, and various forms of farming, such as free-range, tied up in the basement or raised in a paddock next door. This causes pollution from excrement including odor, gas, and waste emissions into water bodies. Impact on the hygiene of people in the community Technology in pit. The swine farming is researched and tested by using the concept of farming with natural agricultural methods to give people and communities benefit from farming as a source of protein. The sale of pigs is income using paddock substrate from agricultural waste materials. A by-product is compost (Narissara et al., 2021)

Ancestors used manure to fertilize plants for thousands years ago (Bogaard et al., 2013) and increases the income of the swine farm owners to sell these soils to farmers. While farmers will benefit from nutrients in the soil where pig manure is also mixed. In addition, the use of soil with pig manure mixed in it for agricultural purposes or as fertilizer for crops will help reduce the problem of pig manure. Total soil organic carbon ,N,P,K increased when applied swine manure to the soil (Jenifer L. et al. ,2021)

Therefore, the researcher is interested in studying the physical characteristics of the soil. Soil moisture value, soil temperature to acidity soil base and soil nutrients in the swine farm areas with pig manure mix. The project aims to apply knowledge about the relationship between soil with pig manure and soil quality in the swine farms to develop villagers' careers in choosing soil for use.

### Objectives

1. To study the physical characteristics of the soil. Soil moisture values, soil temperature Acidity-base of soil and nutrients in the soil around the swine farm and the soil near the swine farm that affects soil quality.
2. To study the similarities and differences between the soil around the swine farm and the soil near the swine farm.

### Hypothesis

1. The soil around the swine farm has better soil quality than the soil near the swine farm.
- 2 . Physical characteristics of the soil moisture values, soil temperature to acidity-base and nutrients in the soil around the swine farm and the soil near the swine farm. There are differences.

### Scope of study

Around of the swine in Thung Khai Subdistrict, Ta Khao District, Trang

## Materials and Method

### Materials

- 1) Soil color book
- 2) Tape measure
- 3) Straw rope
- 4) Flag
- 5) Acidity-Base Test Kit
- 6) Globe Observer Application
- 7) Thermometer
- 8) pH meter
- 9) N P K Soil test kit
- 10) Soil Texture Classification Guide
- 11) Digital soil meter
- 12) Soil thermometer
- 13) Multipurpose Meter

### Method

#### 1. The Study Site

This study was conducted at a the swine farm in Thung Khai Subdistrict, Yan Ta Khao District, Trang Province .It was conducted at the soil of two swine farms.The first farm is located at the coordinates of 7.4562731 degrees north latitude. Longitude 99.6431365 degrees East and soil near the swine farm.The second farm is located at coordinates 7.4556465 degrees north to longitude 99.6429692 degrees East.The study was conducted by determining two soil data collection points: the soil around the swine farm and soil near the swine farm. The research team collected soil data from December 2023 to February 2024.



**Figure 1.** Collecting soil sample



**Figure 2.** The swine farm.

## 2. Procedures and Data Collection

### Soil Quality Data Collection

Soil quality measurements were made according to the GLOBE methodology by studying soil texture characteristics. Soil structure, soil color Measure, soil temperature, Soil pH, Soil moisture and soil fertility from N P K in the soil as follows;

- 1) Determine the sampling point in the pig pen, Is around the swine farm and in the vicinity of the swine farm. Each area collects soil samples at 3 points for a total of 6 soil samples. 2) Study the physical characteristics of the soil by studying the soil structure using CU Smart Lens.
- 3) Measure the temperature of the soil at all points by bringing a thermometer to measure the soil temperature at a depth of 10 centimeters to read the soil temperature value. Data collected 3 times.
- 4 ) Measure soil moisture at all points by bringing a multi-purpose meter to a depth of 5 centimeters to read the soil moisture. Data collected 3 times.
- 5) Soil samples were collected at all sampling points to study soil properties according to various indices in the laboratory such as PH, N, P and K values. Measure the pH of the soil using indicator paper and measure N, P and K using the N P K test kit in the soil.

### 2.2 Data analysis






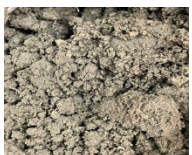
- 1) Soil analysis Soil moisture values, soil temperature Acidity Soil bases and soil nutrients using mean and standard deviation.
- 2) Compare soil quality from the swine farms. Using one way ANOVA.

## Results and Discussion

The results of the experiment were to study the relationship between soil in the swine farm area and the vicinity of the swine farm that affects the quality of the soil :

### 1. Study of soil physical characteristics around the swine farms and near the swine farms

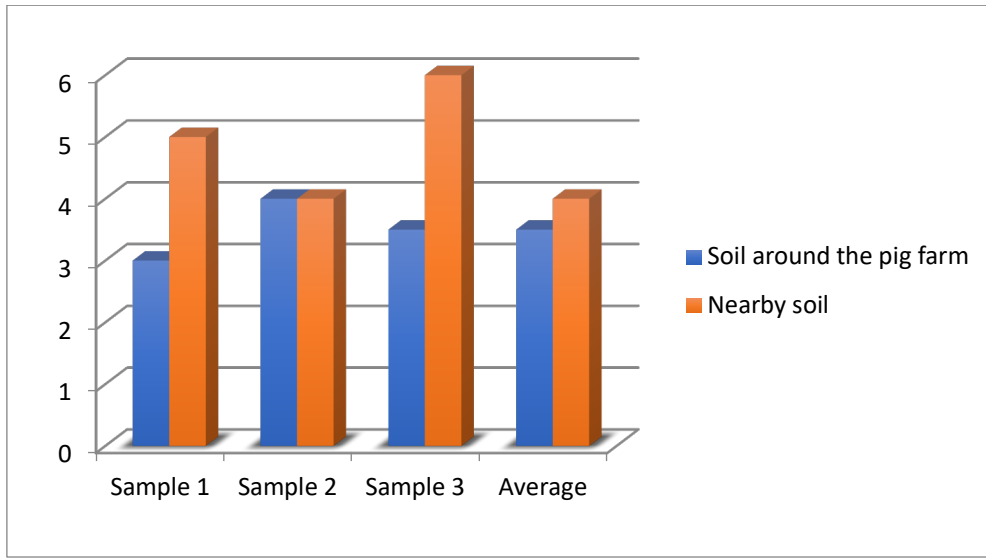
**Table 1** shows the physical characteristics of the soil around the swine farm and in the vicinity of the swine farm.

Study area		Soil Structure	Soil Consistence	Soil Texture	Soil Sample
Soil around the swine farm	Sample 1	Single grained	Loose	LOAMY SAND : LS	
	Sample 2	Single grained	Loose	LOAMY SAND : LS	
	Sample 3	Single grained	Loose	LOAMY SAND : LS	
Nearby soil	Sample 1	Granular	Friable	LOAM : L	
	Sample 2	Granular	Friable	LOAM : L	
	Sample 3	Granular	Friable	LOAM : L	

From **Table 1** was found that the soil around the swine farm has a single-grain structure. The adhesion of the soil does not stick together and the soil texture is sandy and loamy. The soil near the swine farm is nodular like a crumbling cookie candy and is usually smaller than 0.5 centimeters in diameter. The adhesion of loamy soil and the soil texture are loamy.

## 2. Study of soil moisture values the swine farm area and the swine farm vicinity

**Chart 1** shows the soil moisture values around the swine farm and in the vicinity of the swine farm.



From Chart 1, when calculating the average, it was found that the soil in the swine farm area had an average moisture content of 3.5 and the soil near the swine farm had an average moisture content of 4.

## 3. Study of soil temperature Pigsty area without pig droppings and pig droppings

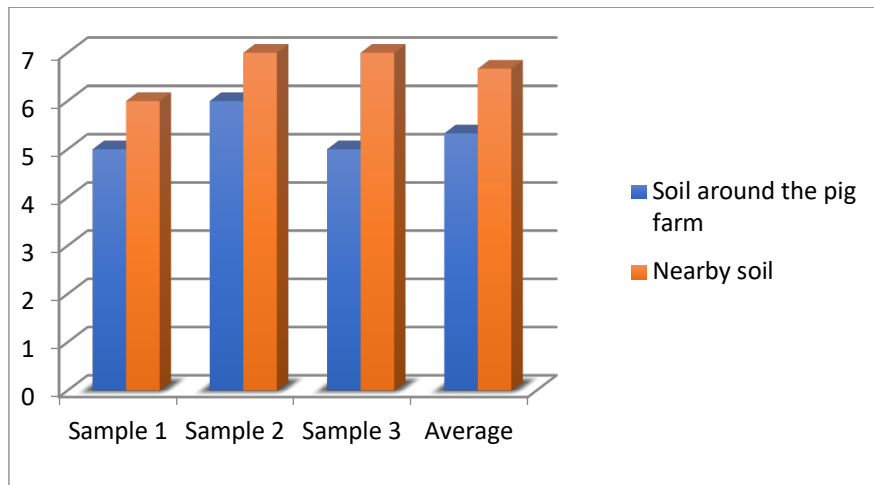
**Table 2** shows the temperature of the soil for Pigsty area without pig droppings and pig droppings.

Study area	Temperature (° C)			
	Sample 1	Sample2	Sample 3	Average
Soil around the swine farm	36	35	34	35±1
Nearby soil	37	39	38	38±1

From Table 2, the average soil temperature at and around the swine farm was  $35 \pm 1$  °C and  $38 \pm 1$  °C, respectively. Therefore, it can be said that the soil in both areas has different temperatures with the soil around the swine farm having a higher temperature than the neighboring ones.

4. Study of soil acidity-base in the area of the swine farms and in the vicinity of the swine farms.

**Chart 2** shows the acidity-base of the soil in and around the swine farm



From Chart 2, When calculating the average, it was found that the pH of the soil near the swine farm was 5.33 and the pH of the soil near the swine farm was 6.67 . Therefore, it can be concluded that the soil around the swine farm has a pH value less than nearby soil.

5. Study of soil nutrients in the area of the swine farm and the soil near the swine farm.

**Table 3** shows soil nutrients around the swine farm and the soil near the swine farm.

Study area	Amount of N , P , K in soil								
	Sample 1			Sample 2			Sample 3		
	N	P	K	N	P	K	N	P	K
Soil around the swine farm	3	2	1	3	2	1	3	2	1
Nearby soil	2	1	1	2	1	1	2	1	1

Hight = 3, Medium = 2, Low = 1, Trace = 0

From Table 3, it was found that both areas of soil have different soil nutrients. The soil in the swine farm area contains more nitrogen than the soil near the swine farm. The soil around the swine farm contains more phosphorus than the soil near the swine farm.

Both areas of soil have the same amount of potassium.



## Discussion

From soil quality studies in the area of the swine farms and nearby the swine farms. It was found that the swine farm area has a single-grain structure. The adhesion of the soil does not stick together and the soil texture is sandy and loamy. The soil near the pig is nodular in shape. Loosen crumbly and often smaller than 0.5 centimeters in diameter. It is often found in soils where organic matter and plant roots grow. Soil moisture of the vicinity of the swine farms is the most valuable. The temperature of the soil near the swine farm is the most valuable. The pH in the soil near the swine farm is the most valuable, and the nutrients in the soil in both areas are different with the soil in the swine farm having more N and P content than the soil nearby, and the soil in both areas having the same K content. According to Jenifer L. et al. (2021) swine manure can reduce nutrient imbalance and improve soil health such as Carbon ,Nitrogen , Phosphorus and Potassium.

## Conclusion

The study of the physical characteristics of the soil, its moisture , Acidity-base , temperature and soil nutrients was found that the soil in the area of the swine farm and nearby is different. From the experimental results, it can be applied as an alternative for farmers. In using the soil around the swine farm in various fields because it has a complete supply of nutrients. Of course, another problem with the soil around swine farms is the bad smell. If possible , We would like to research and find ways to make the soil odorless or the smell will be lighter but the nutrients in the soil remain the same. For sustainable use and does not harm the environment as well.

For future we can make soil health papers to use swine manure ass an amendment, include the following soil data : soil data (Bulk density , soil texture, pH ,total NPK ,MBN and MBN), soil physical , soil chemical and biological properties

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### Appendix



**Figure 3** Taken with the owner of the soil near the swine farm.



**Figure 4** Soil N P K Test Kit of the swine farm.



**Figure 5** Soil N P K Test Kit of Soil around the swine farms.



**Figure 6** Check the pH of soil around the swine farms.



**Figure 7** Soil filtration and filterable liquid are used for further monitoring.



**Figure 8** Prepare soil samples in both areas.

### IVSS Badges

#### **I am a Problem Solver.**

Since we have studied a lot of information, we are interested in the studies about soil. Leading to explore in the area for in-depth study by various equipments. As well as collecting soil samples and other information for further study in the laboratory. Then, take it all for analysis with different technologies. After that interpret the results in various forms to make it easy for anyone who interested in studying and researching.

#### **I am a Collaborator.**

We have a good team works. There is a clear division of duties. Have good leadership and followership, set good plans to achieve the goal, which is effective to the disseminated information for using in other studies, as well as having unity to encourage each other. They make our research successful.

#### **I am a Data Scientist**

We have done a survey in the real place to collect all information for research. There was an actual field to study the physical characteristics, moisture, and temperature of the soil. Following the working steps relying on the management-storage-collection-inspection-analysis process, in order to get accurate information and the most effective result. Then, the information obtained can be used for further development and problem solving.