Research Title : Study and Comparison of Soil Quality in Peanut Growing Areas Before and After Peanut Planting Ban Pho Subdistrict, Mueang District, Trang Province Thailand

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Abstract

Study and compare soil quality in peanut growing areas Ban Pho Subdistrict, Mueang District, Trang Province Thailand The objectives are 1) To study the soil quality in the peanut growing area. 2) To compare soil quality before and after in the peanut growing area by checking soil temperature, pH, soil nutrients, soil sedimentation, soil color, etc. The results of the study showed that the soil in the area before planting the beans And after planting, the soil is crumbly. and the seizure of loamy soil. Compare the temperature in the soil before and after planting. The temperature of the area before planting was about 1.47 °C higher than that of the area after planting, and the temperature was stable. The pH value of the area before planting is neutral with the area after planting, there is a base and moisture value in the soil before planting. The moisture value is less than the area after planting, the abundance of (N,P,K) in the area before and after planting. Nitrogen value (N) after planting is 10 mg/kg higher than before planting, phosphorus value (P) The potassium (K) value after planting was 40 mg/kg higher than before planting , and the potassium (K) value after planting was 120 mg/kg higher than before planting.

Keywords : peanuts, soil quality, soil temperature, relative humidity, soil nutrients

Introduction

Soil quality is the ability of soil to support plant growth. Agricultural products and maintain ecological balance. Nutrient sufficiency (N-P-K), moisture-holding and breathable (pH 6.5-7.5).

Peanuts (Arachis hypogeae) are classified as plants in the Leguminoseae family, and can be commonly grown in both tropical and subtropical regions of the world. For peanut cultivation in Thailand, it is an economically important field crop and is classified as a good soil improvement crop because it has root knots that can fix nitrogen from the air. As a result, the soil will be more fertile. This study therefore wanted to compare soil quality before and after cultivation to confirm the soil-enhancing properties of peanuts. In addition to helping to increase income for farmers. It also increases soil fertility and has a positive effect on plants planted in the next season. Comparative study of soil quality in the area before and after planting peanuts.

The research team studied and compared the soil quality in the peanut growing area. Ban Pho Subdistrict, Mueang District, Trang Province Thailand Therefore, it is important to know the differences in the soil in the area and the suitability of the soil for growing peanuts. The results of the study can be used as information for soil improvement and management.

Objectives of the research

1. To study the soil quality in the area before and after planting peanuts. Ban Pho Subdistrict
2. To compare soil quality before and after in peanut growing areas. Ban Pho Subdistrict

Scope of study

Study the structure of the soil, the color of the soil, measure the adhesion of the soil, study the soil texture, soil temperature, soil moisture, acidity-base of the soil. Farm area, Mueang District, Trang Province

Research Questions

Does the soil in the area before and after planting peanuts differ in soil quality?

Research Hypothesis

The soil in the area before and after planting peanuts differs in soil quality.

Materials and equipment

1. Soil Sampling Box
2. Decimal Scales
3. pH Test Kit
4. Distilled water
5. Glassware
6. N P K Test Kit
7. Earthmoving hoe
8. Temperature and Relative Humidity Meter
9. Clock

Principles of measurement methods

GLOBE Measurement Methodology

Pedosphere Protocols

Atmosphere Protocols

Designation of study points

Designate 2 study points, namely the peanut plantation area in Ban Pho sub-district, Mueang district, Trang province. Geographical Coordinates: Latitude(N) 7.6269480 °N, Longitude(E) 99.6460350 °E

How the research is conducted

1. Research Preparation Stage
    1) Setting up education issues Select the topic you want to study.
    2) Research Gathering knowledge and theories related to research
    3) Determine the purpose of education.
    4) Determine the sampling point in the study area.
2. Procedures and data collection

Part 1 Soil Sample Collection for Measurement according to the GLOBE Principle

1. Survey and determine sampling points in the field. Ban Pho Subdistrict, Mueang District, Trang Province Determine the sampling point twice, before planting peanuts and after planting peanuts.

2. Measure the temperature of the soil. By thermometer For temperature measurement at a depth of 10 centimeters, wait 5 minutes, take a reading, and then record the result.

3. Measure the pH of the soil using chemicals.

1) Weigh a sample of dried and sifted soil to 20 grams and pour it into a beaker.

2) Add 20 ml of distilled water to get a soil:water ratio equal to 1:1.

3) Stir the soil with a glass stick for 30 seconds and let it rest for 3 minutes. Do this 5 times.

4) When the clay has been stirred 5 times. Leave it until the soil in the beaker settles, and you can see clear water at the top.

5) Compare the color with the color comparison plate, read the value and wait for the result to be recorded.

4. How to measure soil nutrients

1) Weigh a sample of dried and sifted soil to 20 grams and pour it into a beaker.

2) Add 20 ml of distilled water to get a soil:water ratio equal to 1:1.

3) Stir the soil with a glass stick for 30 seconds and let it rest for 3 minutes.

4) Leave it until the soil in the beaker settles, and you can see clear water at the top.

5) Suck the clear water on top, put it in a test tube and apply 2 to 3 drops of the substance.

6) Close the lid and shake. Compare the color with the color plate. Read the value and then save the result.

5. Soil sequestration measurement method

1) Spray with water and pull out the soil grains, observing the fixation of the soil (repeat this for all layers of soil).

2) Hold the clay grain between your thumb and index finger and gently squeeze the clay grain until it breaks into parts.

3) Record the sequestration characteristics of the soil.

6. How to measure soil color

1) Pick up the soil grains from each layer of soil samples and observe them and record on the data sheet whether the soil grains are moist, dry, or wet. If it is dry, slightly moisten it with the aunt from the prepared jar.

2) Divide the clay grain into 2 parts.

3) Stand and let the sunlight shine over your shoulder to the soil coloring comparison book and the soil sample being measured.

4) Record the soil color value on the data sheet.

7. All the data is used to compare the soil quality before and after in the peanut growing area. Data Logs

Table 1 Geographical Coordinates

From Table 1 Geographical coordinates Conducted a study in Na Tham Nuea Subdistrict, Mueang District, Trang Province.

Nature Trail	Geographical coordinates	
	Latitude(N)	Longitude(E)
	7.6269480 °N	99.6460350 °E

Geographical coordinates Peanut Plantation Plot 7.6269480 °N, 99.6460350 °E

Table 2 shows the soil temperature of the study area.

Districts	1st time	2nd time	3rd time	Average
Before planting	30.2℃	30.2℃	30.2℃	30.2℃
After planting	29.0℃	28.7℃	28.5℃	28.73℃

From Table 2, showing the soil temperature value in the studied area, it was found that the temperature of the area before planting was about 1.47 ℃ higher than the area after planting.

Table 3 shows the acidity-base values of the studied area.

Districts	1st time	2nd time	3rd time	Average
Before planting	7.0	7.0	7.0	7.0
After planting	8.0	8.0	8.0	8.0

From Table 3, showing the pH value of the soil studied area, it was found that the soil in the area after planting was on average higher than the area before planting the soil.

Table 4 shows the abundance value of Nitrogen(N) in the study area.

Districts	1st time	2nd time	3rd time	Average
Before planting	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg
After planting	10 mg/kg	10 mg/kg	10 mg/kg	10 mg/kg

Table 4 shows the abundance value of Nitrogen(N). The area studied found that the area after planting had a nitrogen content (N). Increase by 10 mg/kg

Table 5 shows the abundance value of Phosphorus(P) in the study area.

Districts	1st time	2nd time	3rd time	Average
Before planting	80 mg/kg	80 mg/kg	80 mg/kg	80 mg/kg
After planting	120 mg/kg	120 mg/kg	120 mg/kg	120 mg/kg

Table 5 shows the abundance value of Phosphorus(P). The study area found that the amount of Phosphorus (P) increased by 40 mg/kg after planting.

Table 6 shows the abundance value of Potassium(K) in the study area.

Districts	1st time	2nd time	3rd time	Average

Before planting	0 mg/kg	0 mg/kg	0 mg/kg	0 mg/kg
After planting	20 mg/kg	20 mg/kg	20 mg/kg	20 mg/kg

From Table 6 showing the abundance value of Potassium(K) in the area studied, it was found that the area after planting had a Potassium(K) content. Increased by 20 mg/kg

Table 7 Comparison of Nitrogen(N), Phosphorus(P) and Potassium(K) Abundance Values in Pre-Planting and Post-Planting Areas

Districts	Before planting	After planting	Difference (mg/kg)
Nitrogen(N)	0 mg/kg	10 mg/kg	+10
Phosphorus(P)	80 mg/kg	120 mg/kg	+40
Potassium(K)	0 mg/kg	120 mg/kg	+120

From Table 7, comparing the abundance values of Nitrogen(N), Phosphorus(P), and Potassium(K) in the pre-planting and post-planting areas, it was found that the nitrogen(N) values after planting were higher than before planting. 10 mg/kg, Phosphorus Value(P) The potassium (K) value after planting was 40 mg/kg higher than before planting, and the potassium (K) value after planting was 120 mg/kg higher than before planting.

Table 8 Table showing the results of the soil characteristics test in both areas.

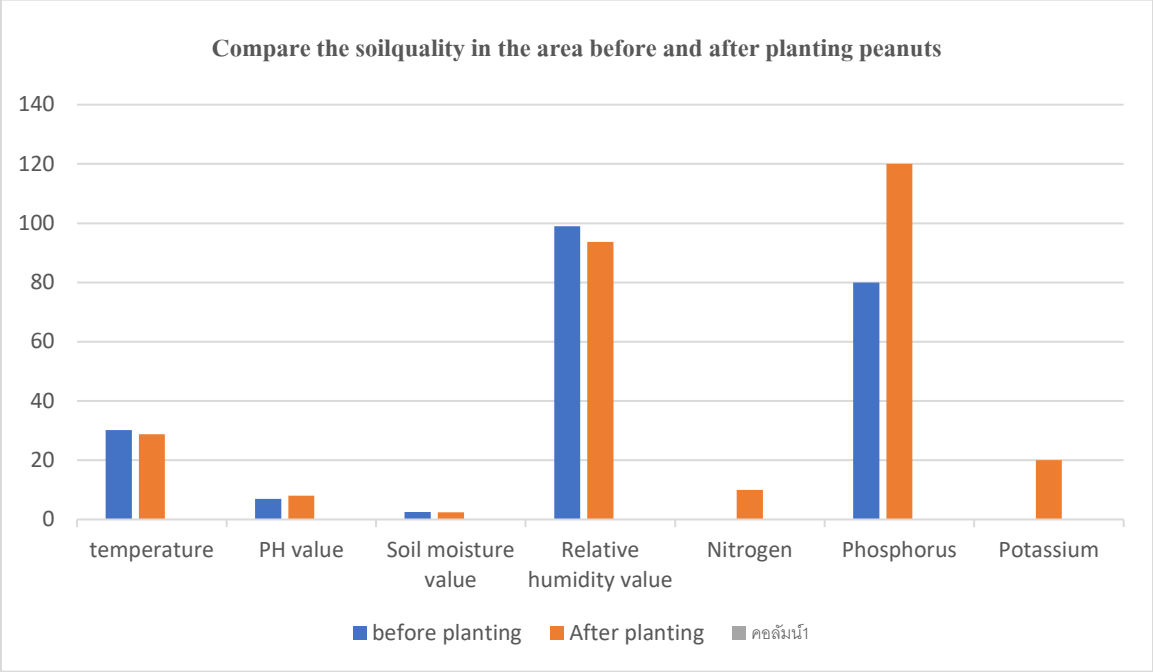
Description	Before planting			After planting		
Clay color	10YR 4/2	10YR 4/2	10YR 4/2	10YR 5/4	10YR 5/4	10YR 5/4
Ground beef	loamy soils	loamy soils	loamy soils	loamy soils	loamy soils	loamy soils
Soil anchorage.	Messy	Messy	Messy	Messy	Messy	Messy

Table 8 shows the results of the soil characteristics test in both areas. It was found that the soil color of the area before planting was 10YR4/2 and the soil characteristics of the area after planting. The soil texture of both areas is loamy and the sequestration of the soil in both areas is loamy.

Table 9 Compare the soil quality in the area before and after planting peanuts.

Factors	Average	
	Before	After
pH	7.0	8.0
Temperature	30.2℃	28.73℃
Soil moisture	2.5%	2.46%
Relative humidity	99%	93.66%
Nitrogen content	0mg/kg	10mg/kg
Phosphorus content	80mg/kg	120mg/kg
Potassium Content	0mg/kg	20mg/kg
Clay color	10YR4/2	10YR5/4
Ground beef	loamy soils	loamy soils
Soil anchorage.	Messy	Messy

From Table 9, which shows the comparison before and after planting, it is found that the nutrient content in the soil after planting peanuts is higher than before planting. The value is similar.



Discussion of research findings

Study and compare soil quality in peanut growing areas before and after planting peanuts. Ban Pho Subdistrict, Mueang District, Trang Province According to the study, the soil temperature value in the area studied was about 1.47 ℃ higher than the area after planting, the pH value of the soil in the area studied after planting was 1 degree higher , and the area before planting compared the fertility of Nitrogen(N). The area after planting has a nitrogen content (N). Increase of 10 mg/kgPhosphorus(P) abundance in the post-planting area with Phosphorus(P) content. The abundance of Potassium(K) increased by 40 mg/kg. An increase of 20 mg/kg compared before and after planting. It was found that the amount of nutrients in the soil after planting peanuts was higher than before planting. The value is similar.

Conclusion

Study and compare soil quality in peanut growing areas before and after planting peanuts. Ban Pho Subdistrict, Mueang District, Trang Province Thailand The results of the study are as follows: It was found that the soil in the area before planting the beans. And after planting, the soil is crumbly. and the seizure of loamy soil. Compare the temperature in the soil before and after planting. The temperature of the area before planting was about 1.47 ℃ higher than that of the area after planting, and the temperature was stable. The pH value of the area before planting is neutral with the area after planting, there is a base and moisture value in the soil before planting. The moisture value is less than the area after planting, the abundance of (N,P,K) in the area before and after planting. Nitrogen value (N) after planting is 10 mg/kg higher than before planting, phosphorus value (P) The potassium (K) value after planting was 40 mg/kg higher than before planting , and the potassium (K) value after planting was 120 mg/kg higher than before planting.

References

GLOBE methodological measurements, soil studies

https://globefamily.ipst.ac.th/globe-protocols/pedosphere-soil

Study how to use a thermometer and relative humidity to measure the temperature and relative humidity of the soil.

https://www.tools.in.th/temperature-monitoring-device/how use-hygrometers/

Learn how to use pH and NPK tests.

https://www.bsmartsci.com/product/345

Agricultural Extension Information 2018/19

http://www.agriinfo.doae.go.th/year62/plant/rortor/agronomy/20.pdf

badges

I AM A COLLABORATO

This project studies and compares soil quality before and after peanut cultivation. Soil is important for plant growth because it provides nutrients such as nitrogen, phosphorus, and potassium. Peanuts are legume plants that can fix nitrogen in the soil through root nodules. Soil samples were collected before planting and after harvesting peanuts. The soil quality was tested by measuring pH, nitrogen content, moisture, and soil texture. The results were compared to observe changes in soil quality.

It is expected that the nitrogen level in the soil will increase after peanut cultivation. This study helps understand how peanut planting affects soil quality and supports sustainable agriculture.

I AM AN ENGINEER

This project aims to study and compare soil quality before and after peanut cultivation. Soil quality is an important factor affecting crop growth, productivity, and sustainability. Peanuts are legume crops that can fix nitrogen in the soil, which may improve soil fertility.

I AM A DATA SCIENTIST

This project applies data analysis techniques to evaluate changes in soil quality before and after peanut cultivation. Key soil parameters include pH, nitrogen (N), phosphorus (P), potassium (K), organic matter, and moisture content.

Soil samples are collected from the same location and depth before planting and after harvest. The data are organized into a structured dataset and analyzed using descriptive statistics (mean, standard deviation, percentage change) and a paired t-test to determine significant differences.

It is hypothesized that soil nitrogen levels will increase after peanut cultivation due to biological nitrogen fixation. The findings support data-driven agricultural planning and sustainable soil management.