



# ANALYSIS OF SOIL PROPERTIES AND SOIL FERTILITY IN THE MARIGOLD PLOT AT VAREE CHIANG MAI SCHOOL

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## ABSTRACT

Soil is a natural resource that plays an important role in ecosystems and agriculture because it is a source of nutrients and a medium for the absorption of nutrients by plants. The purpose of this study was to analyze the soil properties and soil fertility in marigold flower plots. Varee Chiang Mai School focuses on the study of physical properties such as structure, color, adhesion, temperature, and moisture of soil, as well as chemical properties such as pH and macronutrient content (nitrogen, phosphorus, and potassium).

The study was conducted by collecting soil samples from marigold plots and conducting analysis according to the GLOBE Program standards. (N, P, K) Soil pH Meter and Soil Temperature and Moisture Meter. The results showed that the soil in the study area had a pH value in the range of 6.5-6.9, which is suitable for plant to grow. However, it has been found that the nitrogen and phosphorus content in the soil is low, which may be a limited factor for plant growth.

Based on the results of this research, it is recommended that add soil organic matter such as compost and manure to increase nitrogen and phosphorus content, as well as improve soil and water management to maintain optimal soil moisture. This study can be used as a guide to improve soil quality and promote more efficient cultivation of marigolds.

Keywords: soil properties, soil fertility, pH, macronutrients (N, P, K)

## INTRODUCTION

Soil is a natural resource that is of great importance for the survival of humans and other living things on Earth. Whether it is the use of soil in agriculture. Growing plants for food Soil quality monitoring is an important process to assess the suitability of soils for various applications such as crop cultivation, construction, and environmental conservation. Soil quality analysis can be performed in both physical and chemical aspects, including monitoring the soil structure, soil color, etc. soil fixation, soil temperature, Soil moisture, soil acidity-base, and soil fertility (nitrogen (N), phosphorus (P) and potassium (K)). This can be used to improve soil quality and raise awareness among students and school staff about the importance of soil and natural resource conservation.

## OBJECTIVES

- 1) To analyze the physical properties of the soil, including soil structure, soil color, soil adhesion, soil temperature, and soil moisture
- 2) To analyze the chemical properties of the soil, including soil acidity-base and soil fertility (nitrogen, phosphorus and potassium values),
- 3) To evaluate the suitability of the soil in the study area for agricultural use and environmental conservation.

## QUESTION

- 1)How the physical and chemical properties of soil affect soil fertility
- 2) How can soil quality be improved to be suitable for crop cultivation?

## HYPOTHESIS

- 1) The acid-base (pH) value of the soil affects the fertility of the soil.
- 2) Soil moisture affects soil temperature.
- 3) Dark soils tend to be more fertile than lighter soils.
- 4) The soil retention ability affects the water and air permeability in the soil.
- 5) Macronutrients (N, P, K) in the soil are influenced by environmental factors such as organic matter and soil pH.

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Lastly I sincerely hope that this research will be useful to those who are interested in agriculture and the environment and can be applied to improve soil quality for future cultivation.

## MATERIALS AND EQUIPMENT

- 1) Shovel
- 2) Zipper lock bag
- 3) glove
- 4) Munsell Soil Color Chart
- 5) Soil sample
- 6) Sprinkler
- 7) Equipment for collecting soil samples
- 8) Soil bonding comparison
- 9) Needle Soil Thermometer
- 10) plates
- 11) of needle soil moisture meter
- 12) pH Meter Materials and Equipment
- 13) Distilled water
- 14) Equipment Dried and sifted sample soil
- 15) Teaspoon
- 16) Cup holder or test tube
- 17) Soil Characteristics Measurement Data Sheet
- 18) Soil Fertility Test Kit with Test Substance to Determine the N, P and K Values of

## METHODOLOGIES

1. Soil Sampling- Use a shovel to dig soil from 10-20 cm depth, ensuring no contamination.
2. Soil Structure Analysis - Collect soil samples, observe soil structure, and record size and shape.
3. Soil Color Analysis - Use Munsell Soil Color Chart to compare soil color under sunlight.
4. Soil Adhesion Analysis - Observe soil adhesion by squeezing moist soil between fingers.
5. Soil Temperature Measurement - Insert a needle thermometer 10-15 cm into the soil and record temperature.
6. Soil Moisture Measurement - Use a needle soil moisture meter to measure moisture at 5-10 cm depth.
7. Soil pH Measurement - Insert a soil pH meter 5-10 cm into the soil and record pH.
8. Soil Fertility Measurement - Use a soil test kit to measure N, P, and K levels.

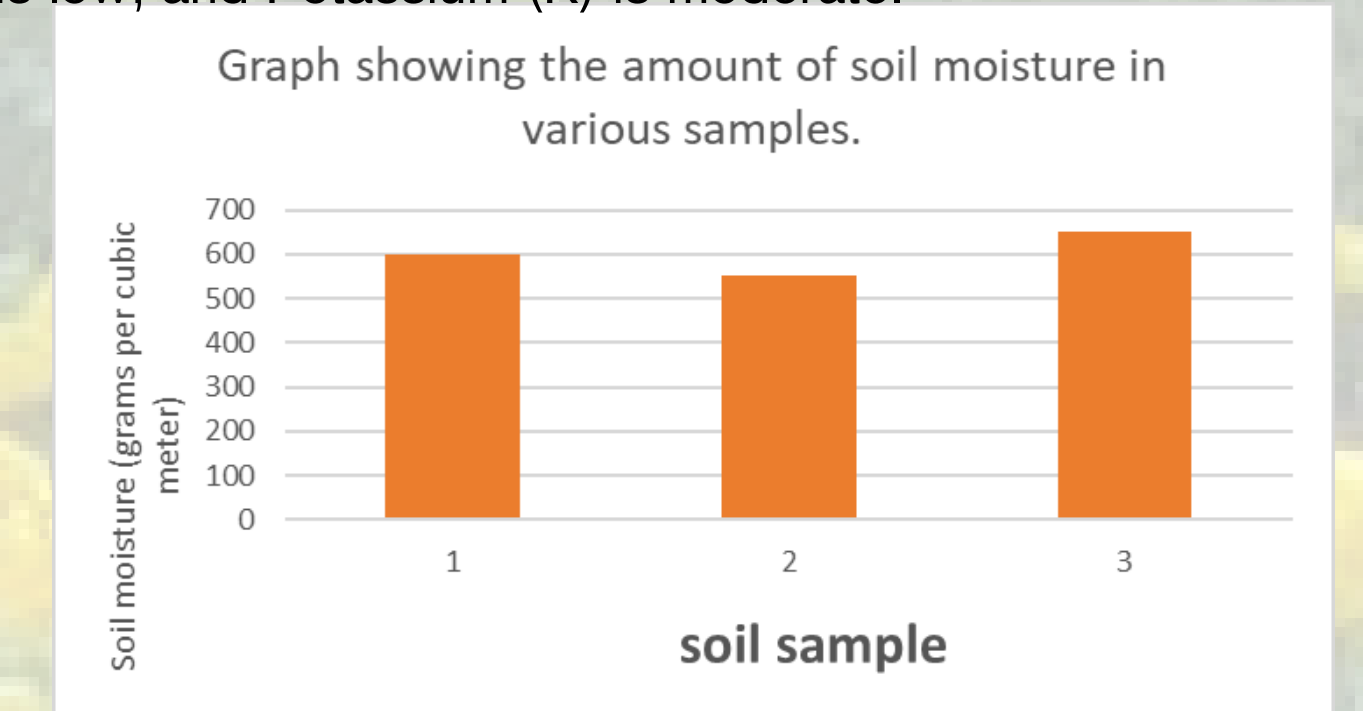
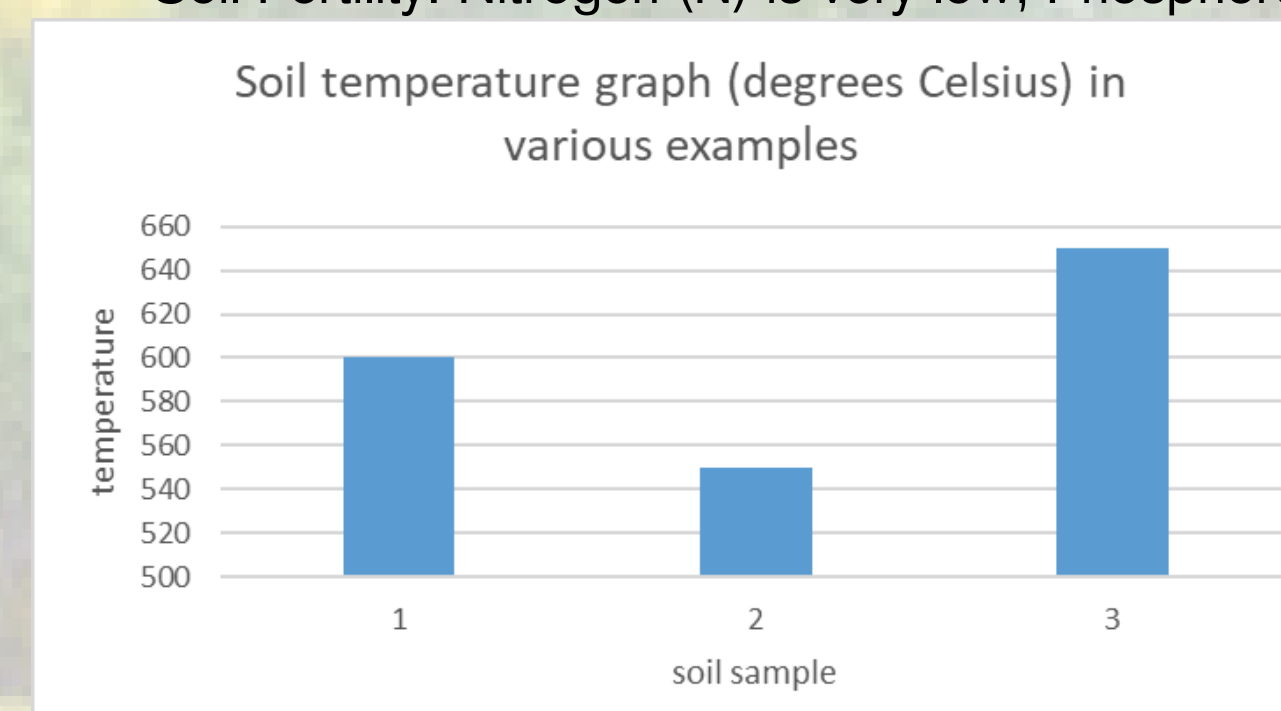
## FINDINGS

### Physical Properties of Soil

- Soil Structure: Sample 1 has a blocky structure (poor drainage), while Samples 2 and 3 have a granular structure (ideal for plant growth).
- Soil Color: Dark soil (10 YR 2/2 and 10 YR 3/3) indicates high organic matter content.
- Soil Adhesion: Sample 1 has tight adhesion, while Samples 2 and 3 have loamy adhesion (good for crops).
- Soil Temperature: 27-28°C (ideal for marigold growth).
- Soil Moisture: 550-650 g/m<sup>3</sup> (suitable for plant growth).

### Chemical Properties of Soil:

- Soil pH: 6.5-6.9 (optimal for marigold growth).
- Soil Fertility: Nitrogen (N) is very low, Phosphorus (P) is low, and Potassium (K) is moderate.



## CONCLUSION AND DISCUSSION

### Physical properties of the soil

- The soil structure in the marigold plot has a different structure for each sample, with sample 1 having a blocky structure which may affect drainage and air in the soil, while examples 2 and 3 have a granular structure which is suitable for drainage and air in the soil.
- Soil color: The soil color in most marigold plots is 10 YR 2/2 and 10 YR 3/3 colors, which indicates that the soil has a high organic matter content. Dark soil colors are often associated with soil fertility, as organic matter is an important source of nutrients needed for plant growth.
- Soil Adhesion: Soil retention in Sample 1 is tight, which can affect soil drainage and air, while Samples 2 and 3 have loamy soil retention, which is ideal for growing crops, as the soil drains well and retains a decent level of moisture.
- Soil temperature: The measured soil temperature is in the range of 27-28 degrees Celsius, which is the ideal temperature for the growth of marigolds. While too low a temperature may slow down plant growth.
- Soil moisture: Soil moisture is in the range of 550-650 grams per cubic meter, which is the right level for growing marigolds.

### Chemical properties of the soil

- Soil Acidity-Base (pH): The pH of the soil is in the range of 6.5-6.9, which is the optimal range for growing marigolds.
- Soil fertility: Analysis of soil macronutrients, including nitrogen (N), phosphorus (P), and potassium (K), found that nitrogen (N) was very low, phosphorus (P) was low, and potassium (K) was moderate.

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