Soil Quality Study in Salted and Non-Salted Areas for Aromatic Coconut Cultivation at Wichienmatu School, Trang Province

Presentation by **Wichienmatu school**

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- **Research Title :** Soil Quality Study in Salted and Non-Salted Areas for Aromatic Coconut Cultivation at Wichienmatu School, Trang Province

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Abstract

This environmental research aims to study soil quality in salted and non-salted areas of aromatic coconut cultivation at Wichienmatu School. The study examines the effects of adding salt to the soil by comparing the soil quality between salted and non-salted areas within the school's coconut plantation.

The results indicate that adding salt does not directly impact soil salinity levels but affects nitrogen and phosphorus concentrations, which tend to decrease. Meanwhile, potassium levels show a slight increase. Additionally, slight changes in soil pH, moisture content, and temperature were observed, which may influence the dissolution of minerals in the soil.

However, these changes have not yet caused significant effects on the short-term growth of aromatic coconut trees.

Keywords : Soil quality, salted coconut plantation, non-salted coconut plantation

Introduction

Background and Significance

Aromatic coconut is one of Thailand's key economic crops due to its fragrant, sweet taste and high-quality yield, which is widely favored both domestically and internationally. The cultivation of high-quality aromatic coconuts depends on various factors, particularly soil quality.

At Wichienmatu School, aromatic coconut trees are grown in an open plantation, with some areas treated with salt to improve soil quality. This practice has sparked interest in understanding the differences in soil characteristics between salted and non-salted coconut plantations.

Therefore, this study aims to examine the soil quality, mineral content, moisture levels, pH, and temperature of the soil in the aromatic coconut plantation at Wichienmatu School, Trang Province. The findings from this research will provide valuable insights into how salt application affects soil quality and plant growth. These insights could encourage coconut farmers to consider soil quality management in order to improve and optimize their yield.

Research Question

Does the soil quality differ between salted and non-salted areas in the aromatic coconut plantation at Wichienmatu School ?

Research Hypothesis

The soil quality in salted and non-salted areas differs.

Independent Variable : Salted and non-salted aromatic coconut plantations
Dependent Variable : Soil quality
Controlled Variables : Measurement tools used for soil testing

Materials and Methods

Controlled Variable : Measurement tools used for soil testing

Materials and Equipment

1. Shovel
2. Salt
3. Measuring tape
4. Soil sample bags
5. Distilled water
6. Beakers, dropper bottles, and glass test tubes
7. Filter paper
8. Soil test kit for measuring pH, nitrogen (N), phosphorus (P), and potassium (K)
9. Soil Moisture Meter
10. Soil Thermometer

Research Methodology

Study Site Selection

This research was conducted in the aromatic coconut plantation at Wichienmatu School, Trang Province. The study site is an open field with pre-existing coconut trees planted across a 450-meter area. The specific study location is at:
Latitude: 7.5059782
Longitude: 99.6287559

Soil Quality Measurement Based on GLOBE Protocol

This study follows the GLOBE soil analysis protocol to assess soil quality by measuring mineral content, pH levels, moisture, and temperature in both salted and non-salted soil areas.

1.Soil Sampling Procedure

Soil samples were collected from the aromatic coconut plantation at Wichienmatu School. The study site was divided into two groups are control group (non-salted soil) and experimental group (salted soil) each group consisted of 6 coconut trees, resulting in a total of 12 soil samples.

2.Soil Mineral Content Analysis (N-P-K Test Kit)

Nitrogen (N) Measurement

- Take 5 mL of soil extract solution from a beaker and pour it into a test tube.
- Add half a sachet of HI 3895-N reagent into the solution.
- Close the test tube and shake until the reagent completely dissolves.
- Compare the resulting color with a nitrate color chart to determine the nitrogen content in the soil.

Phosphorus (P) Measurement

- Take 5 mL of soil extract solution from a beaker and transfer it to a test tube.
- Add half a sachet of HI 3895-P reagent into the solution.
- Close the test tube and shake until the reagent dissolves completely.
- Compare the resulting color with a phosphorus color chart to determine phosphorus content.

Potassium (K) Measurement

- Take 5 mL of soil extract solution from a beaker and transfer it to a test tube.
- Add half a sachet of HI 3895-K reagent into the solution.
- Close the test tube and shake until the reagent dissolves completely.
- Compare the resulting turbidity with a potassium sediment comparison chart to determine potassium content.

3.Soil Moisture Measurement

- Insert the Soil Moisture Meter 10 cm deep into the soil.
- Record the soil moisture level.

4.Soil Temperature Measurement

- Insert a soil thermometer 10 cm deep into the soil.
- Record the soil temperature.

5.Soil pH Measurement

- Dip a pH test strip into the soil extract solution.
- Wait until the reading stabilizes, then record the pH

Result

Section 1: Study of Soil Nutrients Before and After Salt Application in the Golden Dwarf Coconut Plantation

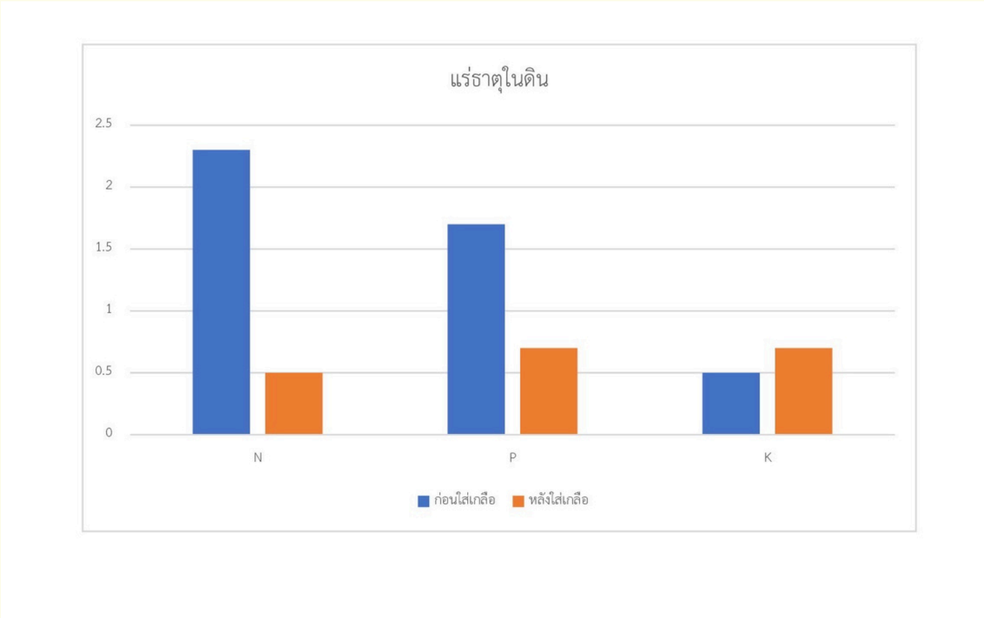

Figure 1: Bar chart representing soil nutrient levels before and after salt application.

Section 2: Study of Soil Moisture Before and After Salt Application in the Golden Dwarf Coconut Plantation

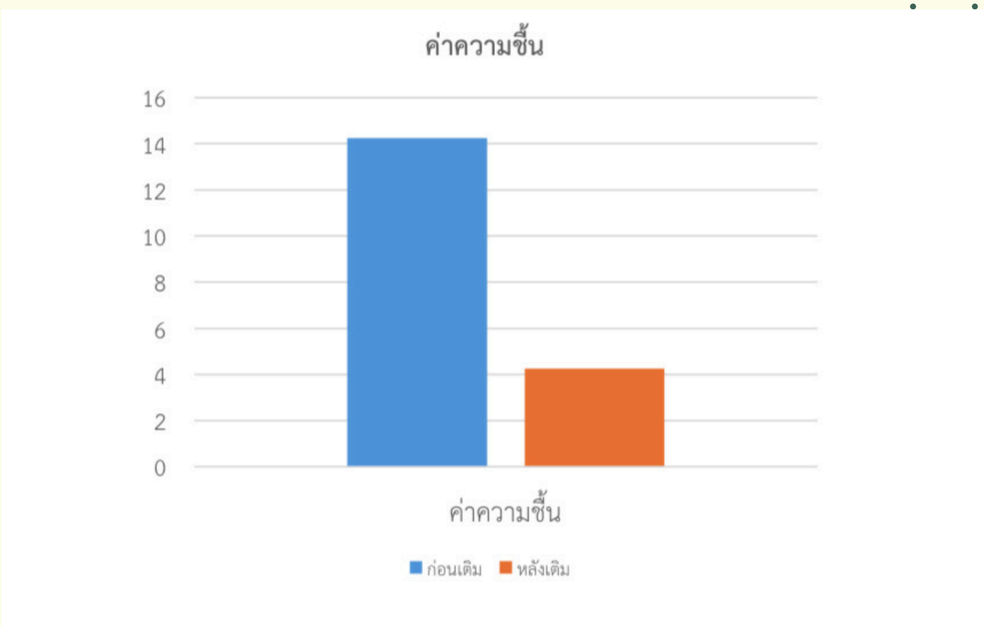

Figure 2: Bar chart representing soil moisture levels before and after salt application.

Result

Section 3: Study of Soil pH Before and After Salt Application in the Aromatic Coconut Plantation

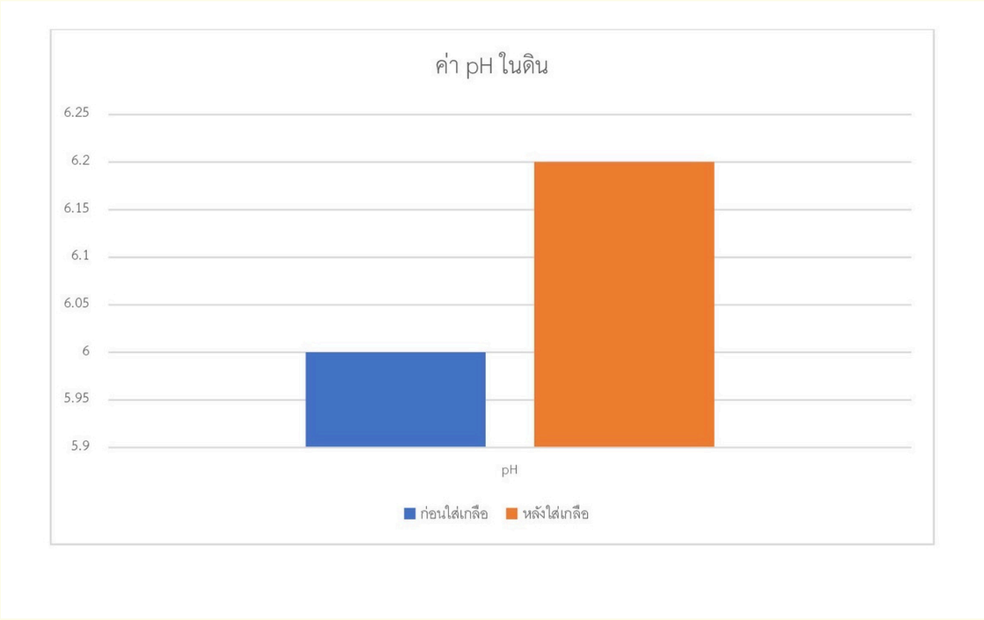

Figure 3: Bar chart showing soil pH levels.

Section 4: Study of Soil Temperature Before and After Salt Application in the Aromatic Coconut Plantation

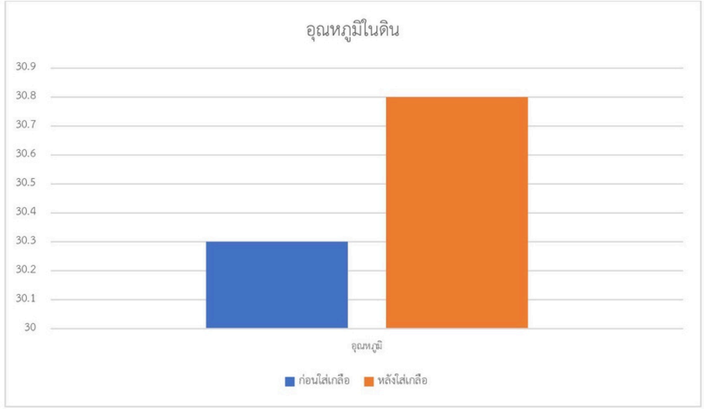

Figure 4: Bar chart showing soil temperature.

Conclusion and Discussion

Conclusion

The study found that salt application did not directly affect soil salinity. However, it led to a decrease in nitrogen (N) and phosphorus (P) levels while slightly increasing potassium (K).

Additionally, minor changes were observed in soil pH, moisture content, and temperature, which may influence the dissolution of soil minerals. However, there were no significant short-term effects on the growth of aromatic coconut trees.

Discussion

1. Soil Nutrients

Nitrogen (N) and phosphorus (P) significantly decreased, possibly due to increased plant absorption during the study period or chemical changes caused by salt application and ph fluctuations. These changes may have reduced the availability of these nutrients.

Potassium (K) slightly increased, which may be due to the dissolution of minerals or the release of potassium from existing soil reserves.

2. Soil Moisture

Soil moisture decreased from 14.25% to 4.25%, a reduction of 10.00 units after salt application.

This indicates that salt may have absorbed or removed moisture from the system, which aligns with its hygroscopic properties.

3. Soil Temperature

Soil temperature slightly increased from 30.3°C to 30.8°C, possibly due to the heat retention effect of salt.

4. Soil pH

Soil pH increased slightly from 6.0 to 6.2, indicating a minor shift toward alkalinity. However, the pH remained within the optimal range for aromatic coconut growth.

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Acknowledgments

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Research Team

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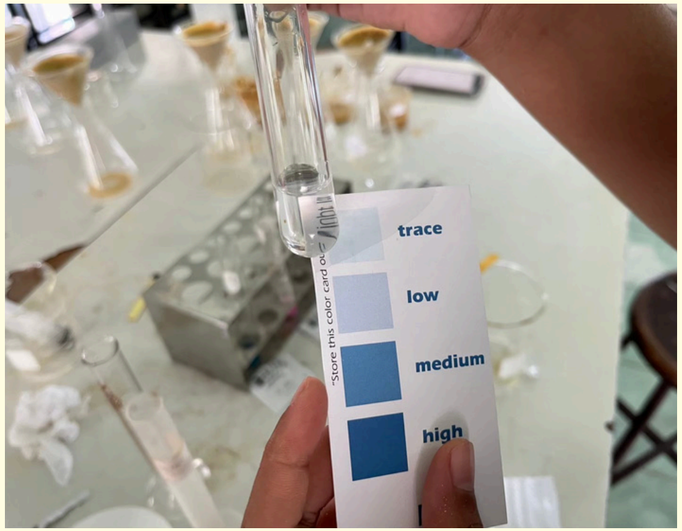
(n.d.) stands for "no date," indicating that the publication year is not specified.

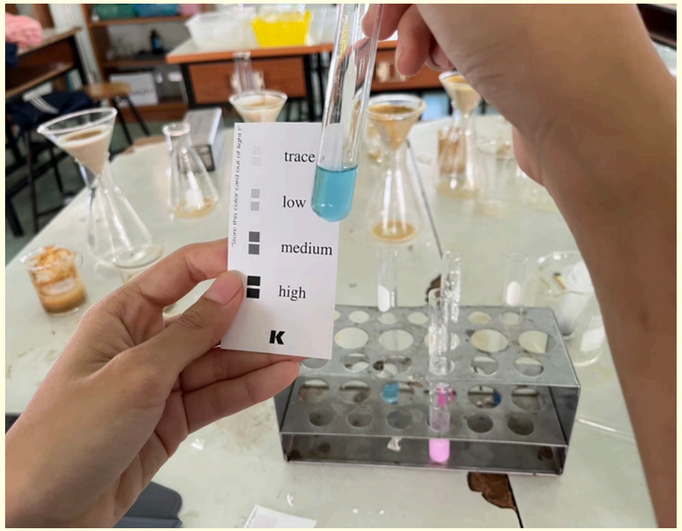
Appendix

Study Site Selection

Appendix

Soil Mineral Content Analysis (N-P-K Test Kit)





Appendix

Soil Moisture Measurement

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Soil Temperature Measurement

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Soil Temperature Measurement

Thank You

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