Research Report

Title: A Comparison of Soil Quality in Mixed Gardens Growing Coconuts and Durian

Research Team

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Research Title: A Comparative Study of Soil Quality in Mixed Gardens Growing Coconuts and Durian in Khosaba Subdistrict, Nayong District

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Abstract

This environmental research focuses on comparing soil quality in mixed gardens growing coconuts and durian in Khosaba Subdistrict, Nayong District. The study examines soil moisture, pH level, temperature, and nutrient composition in areas where coconut and durian trees are grown. The results indicate that the soil moisture under durian trees is higher than under coconut trees. The average pH levels of the soil in both areas are the same. The temperature under coconut trees is higher than under durian trees. Regarding soil nutrients, the average nitrogen (N) and phosphorus (P) levels are equal for both coconut and durian trees, while the average potassium (K) level is higher in the soil under coconut trees than under durian trees.

Introduction

Background and Significance

At present, agriculture remains closely connected to Thailand. As the world continues to develop,technological advancements and new perspectives have emerged to enhance productivity and createbenefits for those in the agricultural sector. Integrated farming has become a method that adds value forfarmers, allowing them to cultivate crops efficiently on their own land.

In Na Yong District, most farmers prefer mixed farming. For example, the mixed farming of AuntSaiyut, who grows Dimocarpus Longan and durian. Before growing Dimocarpus Longan , she had growndurian first, but many of the durian trees died and it was risky to grow only Durian. So she looked forother types of fruit to grow with the remaining durian. It turned out that the Longan produced good products which showed that the soil also affects the agricultural products.

Therefore, the researchers are interested in studying the physical characteristics of the soil, soil moisture content, soil pH, and soil nutrients in mixed orchards in Khok Saba Subdistrict, Na Yong District, TrangProvince. The purpose is to apply the knowledge from research on the relationship between durian andcoconut in mixed orchards and the impact of soil quality on the crops'growth and encouraging farmers to do the mixed cultivation. And it will increase and diversify income throughout the year, enabling farmers toutilize resources efficiently and reduce the risks from fluctuating products' prices.

Research Question

1.How do soil quality, soil moisture, soil pH, temperature, and soil nutrients differ between durian and coconut cultivation areas

Hypothesis

1.Soil quality, soil moisture, soil pH, temperature, and soil nutrients are different between coconut and durian cultivation areas.

Independent Variables: Durian cultivation area, coconut cultivation area

Dependent Variable: Soil quality

Controlled Variables: 1. Time of soil quality measurement 2. Method of soil quality measurement

Materials and Equipment.

1. Acid-Base test kit
2. pH meter
3. NPK Soil tester
4. Soil texture classification guide
5. Soil color book
6. CU Smartlens
7 Glass funnel
8. Erlenmeyer flask
9. Beaker
10. Stirring rod

Research Procedure

1.1 Study Area

This research conducted a study at a mixed garden that grows coconuts and durians.Located on latitude 7.5127782 degrees north, longitude 99.742917 degrees west. The study was conducted by determining the soil collection point in the area. The area where coconut and durian trees are planted, a total of 2 points, 3 times each.

1.2 Procedure and Data Collection

Soil Quality Data Collection

Soil quality will be measured following the GLOBE methodology by examining soil texture, soil structure, soil color, soil temperature, pH, moisture content, and soil fertility based on N, P, and K values.

1.) Determine sampling points: Select two points in the mixed garden area where coconut and durian trees are planted. Collect soil samples from each point, with three samples taken at each point.

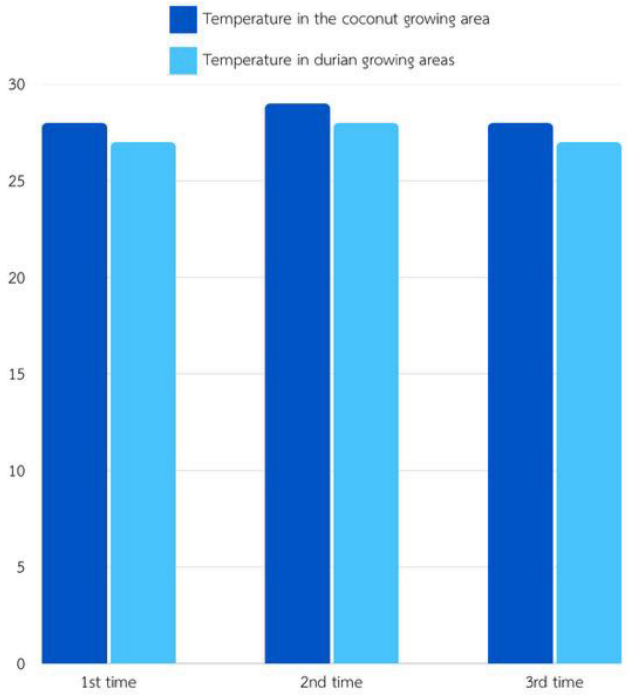
2.) Study the physical characteristics of the soil: Examine the soil structure using the CU SmartLens. Study the soil texture and color by comparing them with the soil color book.

3.) Measure soil temperature at all points: Use a soil thermometer to record the soil temperature. Collect data from two points, three times at each point.

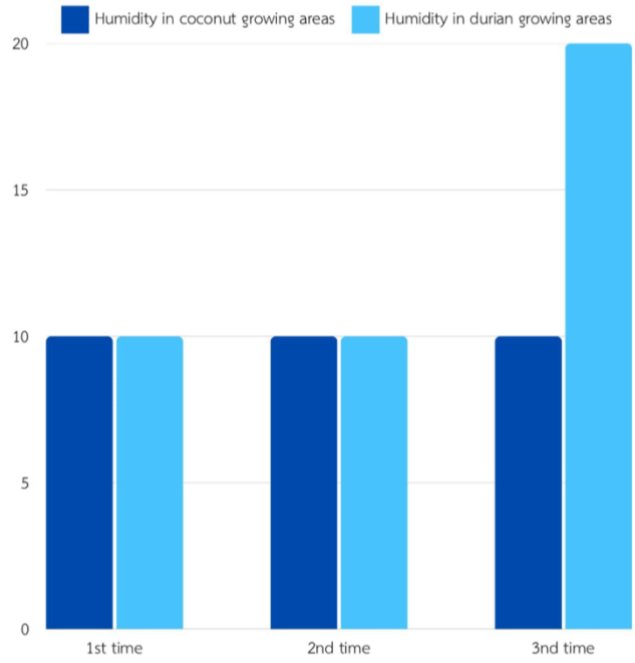
4.) Measure soil moisture at all points: Use a multifunctional meter to measure the soil moisture content. Collect data from two points, three times at each point.

5.) Measure NPK values in the soil at all points: Use an NPK tester to measure the nutrient content in the soil. Collect data from two points, three times at each point.

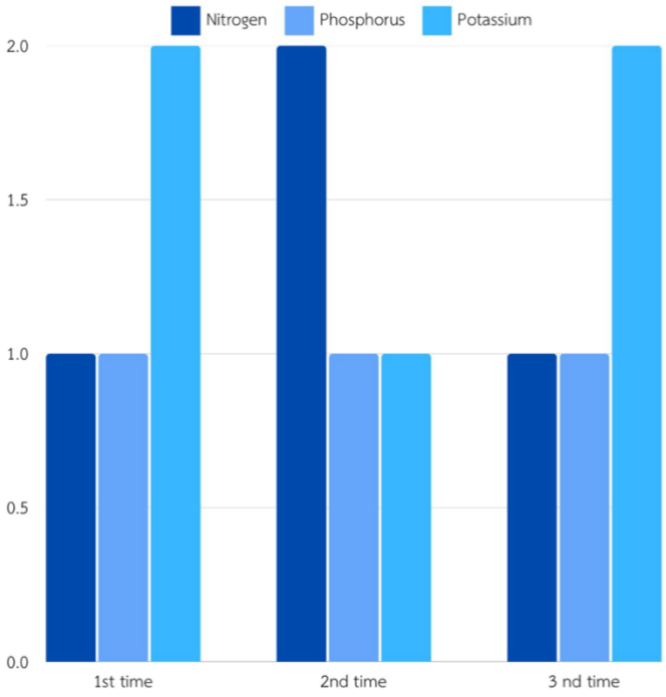
Research results



Bar chart showing soil temperature near coconut and durian trees



Bar chart showing soil moisture near coconut and durian trees



Bar chart showing NPK values of soil beneath coconut and durian trees

Table 1 Soil Moisture Content in the Mixed Garden of Coconut and Durian

Soil in the mixed orchard at Khok Saba Subdistrict, Na Yong District, under study	Soil Moisture Content			
	First time	Second time	Third time	Average
Area under the coconut tree	10	10	10	10
Area under the durian tree	10	10	20	13.3

Table 2 shows the pH values in the mixed orchard growing coconuts and durians

Soil in the mixed orchard at Khok Saba Subdistrict, Na Yong District, under study	pH values			
	First time	Second time	Third time	Averag
Area under the coconut tree	6	7	6	6.33
Area under the durian tree	6	7	6	6.33

Table 3 shows the temperature values in the mixed orchard growing coconuts and durians

Soil in the mixed orchard at Khok Saba Subdistrict, Na Yong District, under study	Soil temperature values (°C)			
	First time	Second time	Third time	Average
Area under the coconut tree	28	29	27	28
Area under the durian tree	27	28	27	27.33

Table 4 shows the nutrient values in the soil of the mixed orchard growing coconuts and durians

Soil in the mixed orchard at Khok Saba Subdistrict, Na Yong District, under study	Minerals	Number of measurements			
		First time	Second time	Third time	Average
Area under the coconut tree	N	1	2	1	1.33
	P	1	1	1	0.33
	K	2	1	2	1.67
Area under thdurian tree	N	1	1	2	1.33
	P	1	1	1	0.33
	K	2	1	1	1.33

Summary of research results

According to the study, in a mixed garden that grows coconuts and durian in Khok Saba Subdistrict, Pho Na Yong Subdistrict, Trang Province. Soil quality affects the growth of coconuts and durians. The soil moisture content under the durian tree is more than the area under the coconut tree is 13.3%. The pH-base of the soil under the coconut tree and under the tree. The average durian is the same at 0.33. The soil temperature under the coconut tree is higher than under the durian tree with an average of 28°C and the soil nutrient value of nitrogen (N). The soil under the coconut tree and under the durian tree is the same at 1.33. Phosphorus (P) Soil under the coconut tree and under the durian tree has the same average of 0.33 and the potassium value (K) under the coconut tree is higher than the average under the durian tree at 1.67

Discuss the results.

This research can discuss the results as follows.

Soil moisture The area under the durian tree has a higher humidity value than the area under the coconut tree. Which is consistent with the nature of durian that requires more water and humidity than coconut to grow. The pH-base of the soil under the durian tree and under the coconut tree is the same average. Which is classified in the small to neutral acidity range Suitable for growing both coconuts and durian The soil temperature under the coconut tree has a higher than the area under the durian tree. This may be due to the characteristics of the bush shape of the coconut tree. Causing sunlight to shine more sunlight to the ground more densely bushed durian Nitrogen (N)and phosphorus (P) in the soil nutrients in the soil under the coconut tree and durian tree have the same average. Which shows the balance of macronutrients in similar soil in both areas Soil and fertilizer management that may be similar characteristics Potassium (K) under the coconut tree is more than under the durian tree this may be the result of the residue of leaves and coconut shells that decompose into nutrients.

Suggestions

1. Soil moisture should always be monitored because humidity changes according to the weather.

2. More should be studied about the structure of the soil, such as soil drainage, which can affect the moisture and temperature of the soil.

Acknowledgement

Preparation of environmental research on comparing soil quality in mixed gardens that grow coconuts and durian in Khok Saba Subdistrict, Nayong District. The preparation team studied for information and conducted experiments on making this project as well as making a project book. Received advice from the advisor teacher in doing the project. Including ideas as well as various defects that need to be solved

I would like to thank Mr. Sakda Paisomboon, director of Wichianmatu School for supporting and helping Mrs. Kwanjai Kanjasrimek and Mrs. Sutheera Thacheen for providing useful advice throughout the operation period. It also suggests solutions in areas that should be improved to make the project more complete. Make this project complete.

Thank you to yourteammates for helping to exchange opinions as well as giving useful suggestions in the development of this project. The organizers sincerely hope that this project will be beneficial to those who are interested and can be applied or expanded in the future.

Research team

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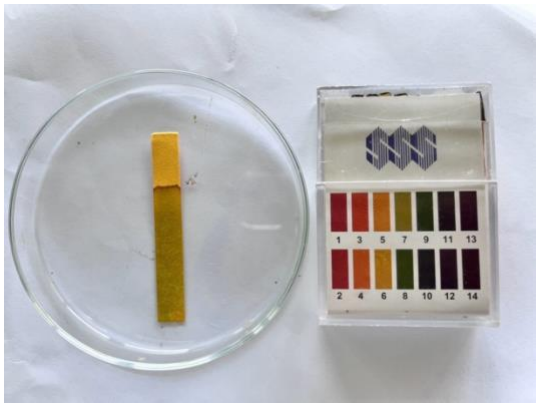
Figure 1, 2: Soil Dissolution and Filtration into a Guava-Shaped Bottle

Figure 3, 4: Temperature Measurement in Soil Where Coconut and Durian are Planted

Figure 5: Measurement of Nutrients in the Soil

Figure 6: Measurement of Soil Moisture Content



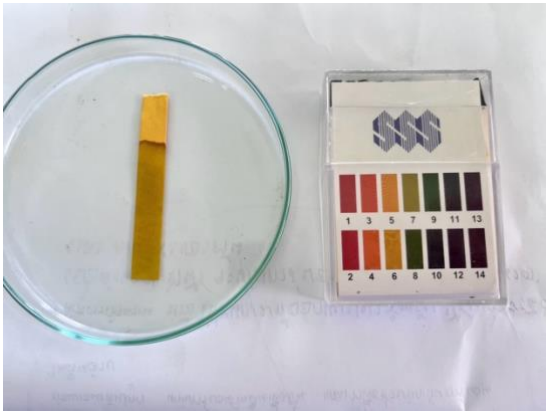


Figure 7, 8: Measurement of Soil pH (Acidity and Alkalinity)