Comparison of Soil Quality with Vetiver Cover and Brazil Nuts

Vetiver Cover and Brazil Nuts

Wichienmatu School

Abstract

Comparison of Soil Quality with Vetiver Cover and Brazil Nuts at Wichienmatu School, Trang Province, the objectives were to compare the soil quality covered with vetiver and Brazil nuts at Wichienmatu School, Trang Province by collecting soil samples from the area where vetiver is grown and the area where Brazil nuts are grown at Wichienmatu School, Trang Province. To analyze and compare soil quality such as nutrient values N, P, K, soil moisture values, and acidity-alkalinity values, the results of the study showed that areas covered by both types of plants have different effects on soil quality. The soil covered by vetiver has nutrient values N, P, K in the soil, better soil moisture, and neutral acidity-alkalinity values. As a result, the quality of the soil with vetiver cover is better than the soil with the Brazil nut cover.

Keywords: Vetiver, Brazil nuts, soil quality

Research Question

Asking Question

The soil cover of vetiver and Brazil nuts in Wichienmatu School, Trang Province affects soil quality. Is it different or not?

Introduction

Content Knowledge

Soil is a natural resource that plays a crucial role in ecosystems and human livelihoods, as it serves as a source of nutrients, a reservoir for water, and a foundation for plant growth. Soil quality directly affects land fertility. When soil becomes degraded, plant growth is hindered, soil erosion occurs, and the soil loses its ability to be used sustainably. Improving soil conditions through the use of cover crops is one approach to soil conservation and quality enhancement. Cover crops help reduce the impact of raindrops, minimize soil erosion, retain soil moisture, and increase organic matter through plant residues, resulting in soil conditions that are suitable for plant growth and soil organisms.Vetiver grass is an important plant for soil conservation due to its deep and dense root system, which effectively stabilizes the soil and reduces topsoil erosion. In addition, it can grow under a wide range of environmental conditions and is therefore commonly used in the rehabilitation of degraded land. Brazilian peanut is a leguminous plant capable of fixing atmospheric nitrogen through root nodules, thereby increasing nitrogen availability in the soil and enhancing soil fertility.Wichienmatu School, Trang Province utilizes its land for learning activities and plant cultivation. Therefore, studying soil quality within the school area is important. Comparing soil quality in areas covered with vetiver grass and Brazilian peanut will help determine the effects of each type of cover crop on soil improvement, including soil nutrient content (N, P, and K), soil moisture, soil pH, and light intensity.

This study aims to compare soil quality in areas covered with vetiver grass and Brazilian peanut at Wichienmatu School, Trang Province, in order to provide guidelines for selecting suitable cover crops for sustainable soil improvement and conservation and to enable the application of these findings to other areas in the future.

Research Methods

Planning INvestions

Deseribes the planning process

Soil quality measurements include:

1. Measurement of nutrients N, P, K in soil
2. Soil moisture measurement
3. Measurement of acidity and alkalinity in the soil

Part 1: Comparison of Soil Quality under Vetiver and Brazil Nut Plant Cover

1. Research Preparation Process

The research preparation process includes: 4 steps are to set up a study topic and choose the topic you want to study. The study collected knowledge and theories related to the research, determined the purpose of the study, and determined the random sampling points in the study area. This research compares the soil quality with vetiver and Brazil nut cover by the method. The measurement of nutrient values N, P, K, soil moisture, and acidity-alkalinity values in areas covered by vetiver and Brazil nuts was measured in 1 area divided into 2 areas of 3 points each, for a total of 6 points, which were separated into 1. Vetiver grass cover 2. Brazil nut cover.

2. Implementation Stages

2.1 Measurement of Soil Nutrients (N, P, K)

Soil samples were collected from all sampling points and prepared using a 1:1 soil-to-water ratio. Nutrient concentrations of nitrogen, phosphorus, and potassium were analyzed using soil test kits.

2.2 Soil Moisture Measurement

Soil moisture was measured at a depth of 5 cm using a soil moisture meter, with five repeated measurements at each sampling point.

2.3 Soil Acidity-Alkalinity Measurement

Soil acidity and alkalinity were measured using dry, sieved soil samples (20 g) mixed with 20 mL of distilled water to obtain a 1:1 soil-to-water ratio. The mixture was stirred for 30 seconds and allowed to stand for 3 minutes, with the procedure repeated five times. After sedimentation, the clear supernatant was used for pH measurement.

Carrying Out Investigations

Deseribes what happened

Table 1 shows the geographical coordinates of Wichienmatu School.

Latitude	Longitude
7.50439° N	99.62835° E

GLOBE Badges

Be a Collaborator

This study conducted through scientific teamwork, involving joint planning, field investigation, soil analysis, and data interpretation. Collaboration among team members strengthened data quality and promoted international scientific collaboration through shared research practices and communication.

Be a Data Scientist

The measured values of soil nutrients (N, P, K), soil moisture, and soil pH from each sampling point were used to calculate mean values for each parameter. The results were then compared between areas covered by vetiver grass and Brazilian peanut to analyze differences in soil quality between the two ground cover types.

Be a STEM Storyteller

This research communicates scientific findings by clearly presenting data, visualizations, and evidence-based conclusions to explain how different ground cover plants influence soil quality in a local environment.

Results

Analyzing Data

Comparison of Soil Quality with Vetiver Cover and Brazil Nuts in Wichienmatu Provincial School Trang has the following results:Part 1 to compare the quality of soil cover with vetiver and Brazil nuts at the Wichienmatu School. Trang Province

Table 2 shows the average nutrient abundance in each area of the soil.

Area	Average nutrient fertility in the soil		
	N	P	K
Vetiver	Medium	Medium	Hight
Brazil Nuts	Medium	Low	Medium

Chart 1: Bar chart shows the average moisture value in wind-covered soils of vetiver and Brazil nuts.

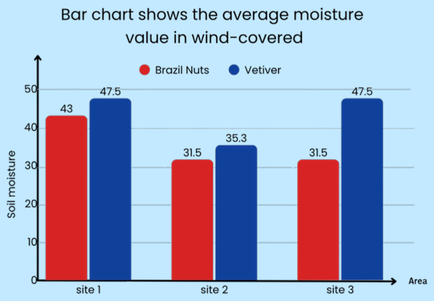
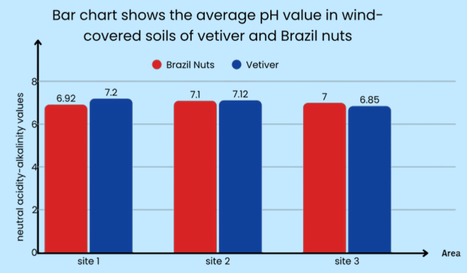


Chart 2: Bar chart shows the average pH value in wind-covered soils of vetiver and Brazil nuts.



Discussion

Interpreting Data

The research on the comparison of soil quality covered with vetiver grass and Brazil nuts in Wichienmatu School, Trang Province was completed because of the support and cooperation from many parties. This is because it was promoted by Mr. Sakda Paisomboon, the Director of Wichienmatu School who promotes and supports the facilities and resources in the research process this time, and the staff of the Trang Provincial Land Office who provide knowledge about the area and provide information on each species of vetiver which is highly useful for the research operation as well.

Thank to our advisors, Mrs. Kwanjai Karnjanasrimak, Ms. Naeriya Tonkrongchan and Dr. Apirak Songrak Advisor from Rajamangala University of Technology, Trang Campus, who gave suggestions. Review, conduct research, and provide assistance throughout the research period. This research was completed effectively. The research team would like to thank all the people involved in this occasion.

Conclusions

Drawing Conclusions&Next Steps

From the study and comparison of soil quality under vetiver grass and Brazilian peanut cover at Wichienmatu School, Trang Province, the results showed clear differences between the two vegetation types. Based on the average values of soil nutrients (N, P, and K), soil under vetiver grass cover exhibited higher soil fertility than soil under Brazilian peanut cover. In the vetiver-covered area, potassium (K) was present at a high level, while phosphorus (P) and nitrogen (N) were at moderate levels. In contrast, soil under Brazilian peanut cover showed moderate levels of potassium (K) and nitrogen (N), whereas phosphorus (P) was found at a very low level.The average soil moisture content measured in areas covered with vetiver grass and Brazilian peanut indicated that soil under vetiver grass cover had a higher average moisture content than soil under Brazilian peanut cover. The average soil pH values measured in both areas showed that soil under vetiver grass cover and soil under Brazilian peanut cover had neutral pH levels, indicating no significant difference in soil acidity or alkalinity between the two vegetation types.

Bibliography

References

Department of Land Development. Vetiver celebrates the honor. Retrieved May 14, 2025, from https://www.ldd.go.th/link_vetiver/

Chanin, Mayutthai. Peanut Vine Planting Guide Amarillo. Retrieved December 28, 2025, from https://nutrition.dld.go.th/nutrition/images/pdf/and/use_amalilo1.pdf

Academic Subcommittee on Monitoring and Evaluation of the Development and Campaign of Vetiver Use Due to the Royal Decree. Interesting facts about vetiver (1st ed.).

Research Report: (Comparison of vetiver grass ecotype and cover crop on improvement of soil physical and chemical properties).

Research and Development Group on the Utilization of Vetiver in Soil Management, Land Management Research and Development Division, Department of Land Development Ministry of Agriculture and Cooperatives. https://elibrary.ldd.go.th/library/flip/bib10217f/bib10217f.html (Retrieved October 2025). Retrieved October 2025, from https://globefamily.ipst.ac.th/globe-protocols