

## The Impact of High NPK Concentration on Floral Diversity in the Coastal Zone of Samet, Chonburi, Thailand

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### Abstract

This current study aims to investigate the relationship between high NPK concentrations in the soil and the resulting changes in floral diversity within the coastal zone of Samet, Chonburi, Thailand. The quality of the soil from the chosen site was tested using the standard protocol from Globe and equipment from Extech. Then, plants thriving in the study site was identified and recorded. The results of the different experiments were observed, gathered, and compared using one-way ANOVA and Tukey HSD Test. Based on the experimentations, results and gathered data, the researchers concluded that there are significant differences ( $p < 0.05$ ) in soil temperature measured at 5 cm, air temperature, and relative humidity but there was no significant difference ( $p > 0.05$ ) in soil pH, soil temperature at 10 cm, and NPK concentration. Furthermore, greater NPK concentrations have a significant impact on floral diversity in Samet, Chonburi, Thailand. Lastly, to strengthen this study, more research is required by comparing the soil quality in Samet's coastline area and nearby districts, as well as the types of plants that thrive in these areas.

**Keywords:** Soil Fertility, Soil Parameter, NPK, Floral Diversity

### Objectives

1. To Investigate if there is a significant difference in soil quality in the coastal zone of Samet, Chonburi.
2. To determine the significant impact of high NPK concentration on floral diversity in Samet, Chonburi.
3. To identify various species of plants thriving in the experimental site.

### Research Questions

1. Is there a significant difference in soil quality measured for 3 times in the coastal area of Samet, Chonburi, Thailand?
2. Do N (Nitrogen), P (Phosphorus), and K (Potassium) concentration have significant impact on floral diversity in the coastal zone of Samet, Chonburi?
3. What floral species are abundant in the experimental site?

### Hypotheses

**Alternative:** The soil quality varies significantly, and increased NPK concentrations have a considerable impact on Floral Diversity in the Coastal Zone of Samet, Chonburi, Thailand.

**Null:** The soil quality did not vary significantly, and increased NPK concentrations have no considerable impact on Floral Diversity in the Coastal Zone of Samet, Chonburi, Thailand.

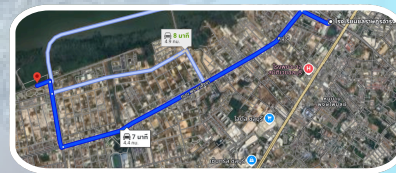
### Introduction

Many years ago, the coastal region of Samet, Chonburi, Thailand, where the current study was carried out, was not yet completely covered by different halophytes, such as mangrove plants, according to the Center of Expertise on Eco-tourism for Mangrove Conservation Chonburi Province. At high tide, marine water readily floods the area. In order to prevent the negative impacts of the high tide phenomenon on the community close to the intertidal zone, the circumstance inspired several groups to turn the area into a habitat for a variety of plants. In its current condition, the place is fully covered by various plants which are valuable in protecting the place from high tide, flooding, and storm surges.

This study focuses on the impact of high NPK concentration on floral diversity in the coastal zone of Samet, Chonburi, Thailand, a region experiencing heightened nutrient concentrations potentially stemming from various sources, including agricultural runoff, wastewater discharge, and tourism-related activities. The delicate balance of floral communities in these coastal areas is crucial for maintaining ecosystem stability, providing habitat for diverse fauna, and supporting local livelihoods. However, the potential impact of elevated NPK levels on the intricate web of plant life remains poorly understood in this specific context. This research aims to investigate the relationship between high NPK concentrations in the soil and the resulting changes in floral diversity within the coastal zone of Samet. By quantifying the spatial distribution of these nutrients and correlating them with floral species richness and composition, the researchers aim to illuminate the ecological significances of nutrient enrichment and provide valuable insights for informed conservation and management strategies. Ultimately, this study endeavors to correlate the abundance of NPK to the diversity of plants in the area, contributing to the sustainable preservation of Samet's unique coastal ecosystem.

### Research Methodology

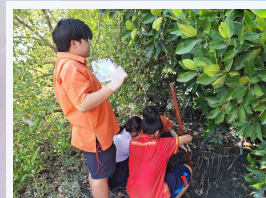
#### A. Study Site



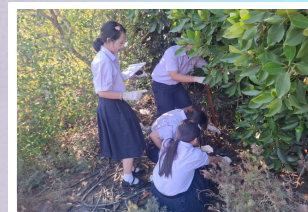
#### B. Soil Quality Testing



#### C. Measuring the NPK of soil



#### D. Identification of Plant Species



#### E. Analysis of data



### Results

The figures below and on the following page show the data encoded on the Globe website from December 2024 to February 2025. Figures 5 through 10 depict the Globe data entry for air temperature, relative humidity, soil pH, soil temperature (5cm and 10 cm depth), and soil fertility measured in the coastal zone of Samet, Chonburi, Thailand.

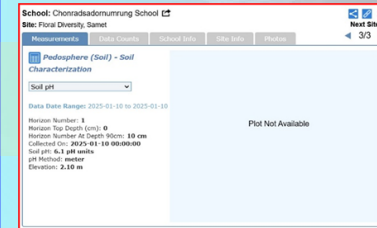


Figure 1. Globe Data Entry for soil pH.

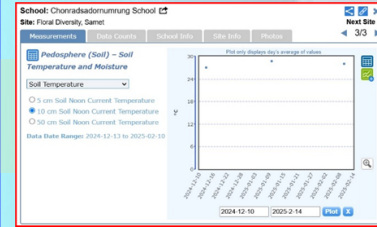


Figure 3. Globe Data Entry for soil temperature (10 cm depth)

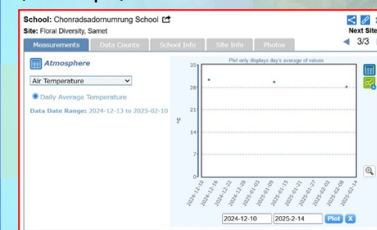


Figure 5. Relative Humidity

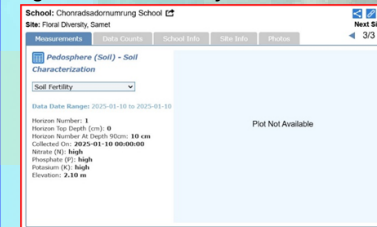


Figure 6. Relative Humidity

Table 1. Average results of soil parameters measured in the coastal zone of Samet, Chonburi.

Parameters	13 Dec 2024 (6:00 PM)	10 Jan 2025 (6:00 PM)	10 Feb 2025 (6:00 PM)
Soil Fertility	Ideal	Ideal	Ideal
Soil pH	5.4	6.13	6.87
Soil Temperature (5 cm) (°C)	26.47	28.33	29.67
Soil Temperature (10 cm) (°C)	27	28.67	28
Relative Humidity (%)	55	47.33	56.67
Air Temperature (°C)	30.3	29.6	28.1
Soil Color	Brown	Brown	Gray
Soil Texture	Clay	Clay	Clay
Nitrogen (mg/kg)	437.33	446.67	304.33
Phosphorus (mg/kg)	627.33	663.33	449.67
Potassium (mg/kg)	1971	1897.33	1431.33

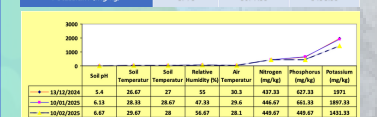


Table 2. Common Plants in the coastal zone of Samet, Chonburi, Thailand.

Plant Photo	Plant Species (Common Name)	Scientific Name	Abundance
	Field sawewort	<i>Artemisia campestris</i>	Highly Abundant
	Black mangrove	<i>Lumnitzera racemosa</i>	Highly Abundant
	Red Mangrove	<i>Rhizophora mangle</i>	Highly Abundant
	Annual seabird	<i>Suaeda maritima</i>	Highly Abundant
	Portia Tree	<i>Thespesia populnea</i>	Highly Abundant
	Shoreline Sea purslane	<i>Sesuvium portulacastrum</i>	Highly Abundant

### Conclusion

Based on the experimentations, results and gathered data, the researchers concluded that there are significant differences ( $p < 0.05$ ) in soil temperature measured at 5 cm, air temperature, and relative humidity but there was no significant difference ( $p > 0.05$ ) in soil pH, soil temperature at 10 cm, and NPK concentration. Furthermore, greater NPK concentrations have a significant impact on floral diversity in Samet, Chonburi, Thailand.

### Recommendations

For the improvement of the study, more research is required by comparing the soil quality in Samet's coastline area and nearby districts, as well as the types of plants that thrive in these areas. Furthermore, the study will be integrated with other branches of science, such as botany and microbiology, to assess the beneficial impacts of the plants in the area on humans.

### Acknowledgment

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