



A Comparative Study of Soil fertility between Mesa and Foothill Sides in Phu Sing hill , Sahatsakhan District, Kalasin Province

Resercher : Kanyanat khamhongsa, Konwipa Chardgarm, Nobpakorn Hansena, Supatchaya Ruangchai,Thadaphorn Supasil

Teacher : Chumpon Chareesan

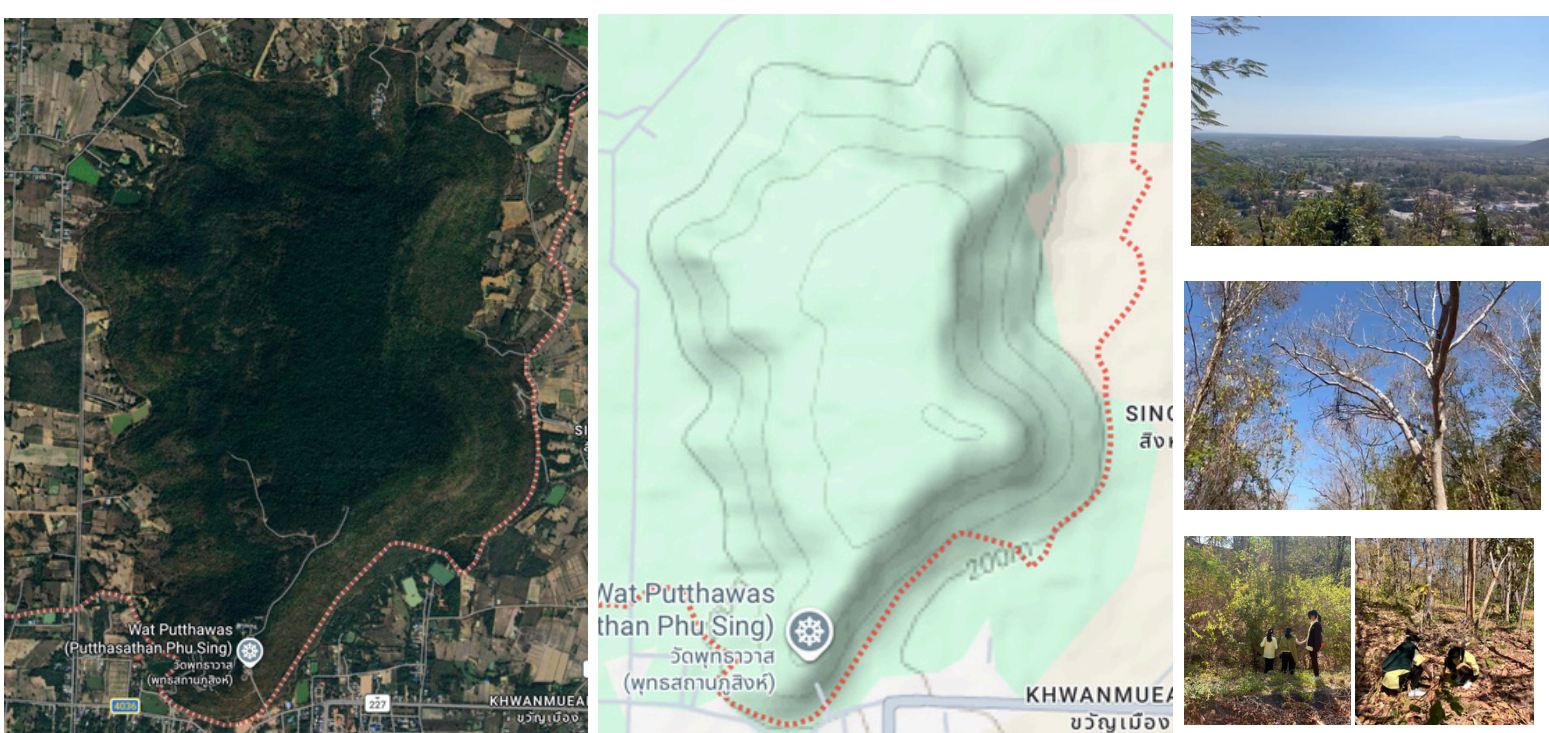


Abstract

This study examines differences in soil chemical fertility between the Mesa (flat-topped) and Foothill areas of Phu Sing Hill, Kalasin Province. Both soils show slightly alkaline conditions suitable for cultivation, with the Mesa soil having a higher pH (7.54) than the Foothill soil (7.22). The Foothill soils are significantly more fertile, with higher concentrations of major nutrients: nitrogen (28.60 mg/kg), phosphorus (112.80 mg/kg), and potassium (105.60 mg/kg), compared to the Mesa soils, which contain lower levels of nitrogen (12.80 mg/kg), phosphorus (76.60 mg/kg), and potassium (69.00 mg/kg). This higher fertility in the Foothill area is attributed to organic matter accumulation and nutrient leaching from higher elevations. Phosphorus levels are high in both areas, especially in the Foothill zone. Therefore, nutrient management in the Mesa area should focus on increasing nitrogen and potassium inputs, while the Foothill area should emphasize maintaining nutrient balance and monitoring potential phosphorus runoff.

Objectives

- To investigate and compare soil chemical fertility, including soil pH and macronutrients (Nitrogen, Phosphorus, and Potassium), between the Mesa top and Foothill areas of Phu Sing hill.
- To provide baseline soil chemical data that can support site-specific soil and nutrient management strategies for sustainable agriculture in Sahatsakhan District, Kalasin Province.



located at Latitude 16.7151°N and Longitude 103.5137°E. Phu Sing hill , Sahatsakhan District, Kalasin Province

Result

Materials and Method

The study area is centrally located at Latitude 16.7151°N Longitude 103.5137°E Phusing and use Soli multi parameter sensor for check temperature, soil nutrient, pH , moisture

Explore

Soil Fertility Investigation on the Mesa Top



Soil Fertility Investigation on the Foothill



Analysis

Comparative Analysis of Soil fertility between Mesa and Foothill

Conclusion

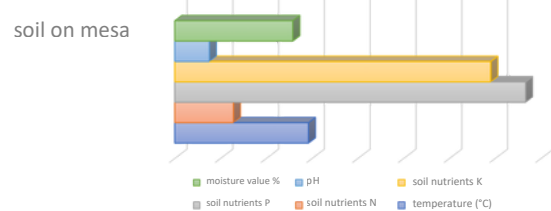
This study highlights distinct differences in soil fertility between the Mesa and Foothill sides in Phu Sing. The Foothill area functions as a "nutrient sink," accumulating significantly higher levels of Nitrogen, Phosphorus, and Potassium compared to the Mesa plateau, which experiences nutrient depletion due to erosion. While both sides are slightly alkaline, the Foothill soil is notably richer. Consequently, sustainable agriculture in this region requires site-specific management prioritizing nutrient enrichment for the Mesa and monitoring high Phosphorus levels in the Foothill zone.

Table 1 : Descriptive soil fertility results about Temperature, soil nutrient (N,P,K) , PH and moisture value of 5 samples from mesa side

soil on mesa	temperature (°C)	soil nutrients			pH	moisture value %
		N	P	K		
1	29.70	15.00	81.00	74.00	7.30	27.30
2	32.00	13.00	78.00	70.00	7.20	26.70
3	30.90	10.00	70.00	63.00	7.90	23.80
4	28.90	16.00	83.00	75.00	7.80	25.50
5	24.40	10.00	71.00	63.00	7.50	25.50

The Mesa side had suitable soil temperature but low to moderate nutrient levels, especially nitrogen, indicating limited soil fertility due to erosion and leaching. Slightly alkaline pH and low soil moisture further suggest restricted nutrient availability and water-holding capacity.

The graph compares the average soil fertility values the mesa



The graph compares the average soil fertility values the foothill

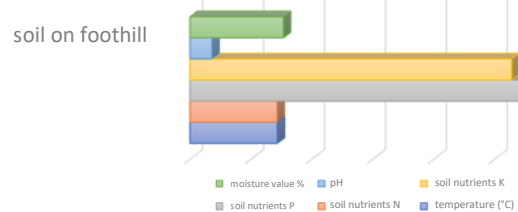


Table 2 : Descriptive soil fertility results about Temperature, soil nutrient (N,P,K) , PH and moisture value of 5 samples from foothill and mean analysis

soil on foot hill	temperature (°C)	soil nutrients			pH	moisture value %
		N	P	K		
1	25.90	32.00	120.00	113.00	7.60	33.40
2	25.60	37.00	133.00	126.00	7.20	25.70
3	30.60	36.00	130.00	123.00	7.30	26.80
4	31.10	20.00	93.00	85.00	7.20	29.70
5	30.00	18.00	88.00	81.00	6.80	37.70

The Foothill side showed significantly higher N, P, and K levels, indicating nutrient accumulation from higher elevations. Near-neutral pH, suitable temperature, and higher soil moisture contributed to greater soil fertility in this area.

Table 3 : compared soil fertility mean analysis between Mesa side and Foothill side

Area	temperature (°C)	soil nutrients			pH	moisture value %
		N	P	K		
soil on mesa	29.18	12.80	76.60	69.00	7.54	25.76
soil on foothill	28.64	28.60	112.80	105.60	7.22	30.66

The Foothill side showed significantly higher N, P, and K levels, indicating nutrient accumulation from higher elevations. Near-neutral pH, suitable temperature, and higher soil moisture contributed to greater soil fertility in this area.

