

Study on Soil Quality in Different Seasons Affecting Groundwater Quality for Domestic Use in Ban Suan .



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Abstract

This study investigates the physical and chemical quality of groundwater in Ban Suan 75/5, Moo 9, Tambon Khok Lo, Mueang District, Trang Province, comparing it to consumption standards. Conducted during the rainy (Sept–Oct) and dry (Dec–Jan) seasons, it examines how seasonal changes affect groundwater quality. The study period was from September 27, 2024, to January 30, 2025.

Results showed that groundwater met standards in the rainy season but exceeded iron and copper limits in the dry season. After filtration, the water became suitable for consumption. The dry season's high soil EC value (150 mS/m) led to increased Fe and Cu levels compared to the rainy season. This occurred because the shallow groundwater level dropped significantly, allowing deeper saline groundwater to seep upward and mix with it, raising salt concentrations.

Keywords: Water quality, Soil quality, Potable water

Research Methodology

- STEP 1 Define the study area
- STEP 2 Water quality testing
- STEP 3 Soil quality testing
- STEP 4 Collect water and soil data for study



Introduction



- Step 1: Prepare soil samples from two locations at depths of 10 cm and 20 cm.
- Step 2: Prepare groundwater and filtered water samples.
- Step 3: Measure the water quality parameters, including pH, phosphate, copper, nitrate, iron, and dissolved oxygen.
- Step 4: Measure soil properties, including fertility (N, P, K), pH, and salinity.
- Step 5: Compare and analyze the obtained data.

Research Questions

- Does the physical and chemical quality of groundwater affect consumption and use at Ban Suan 75/5, Moo 9, Ko Klo Subdistrict, Mueang District, Trang Province?
- Is the groundwater quality in the area of Ban Suan 75/5, Moo 9, Ko Klo Subdistrict, Mueang District, Trang Province within the standard criteria for consumption?
- Does the quality of the soil in different seasons affect the quality of water?

Hypotheses

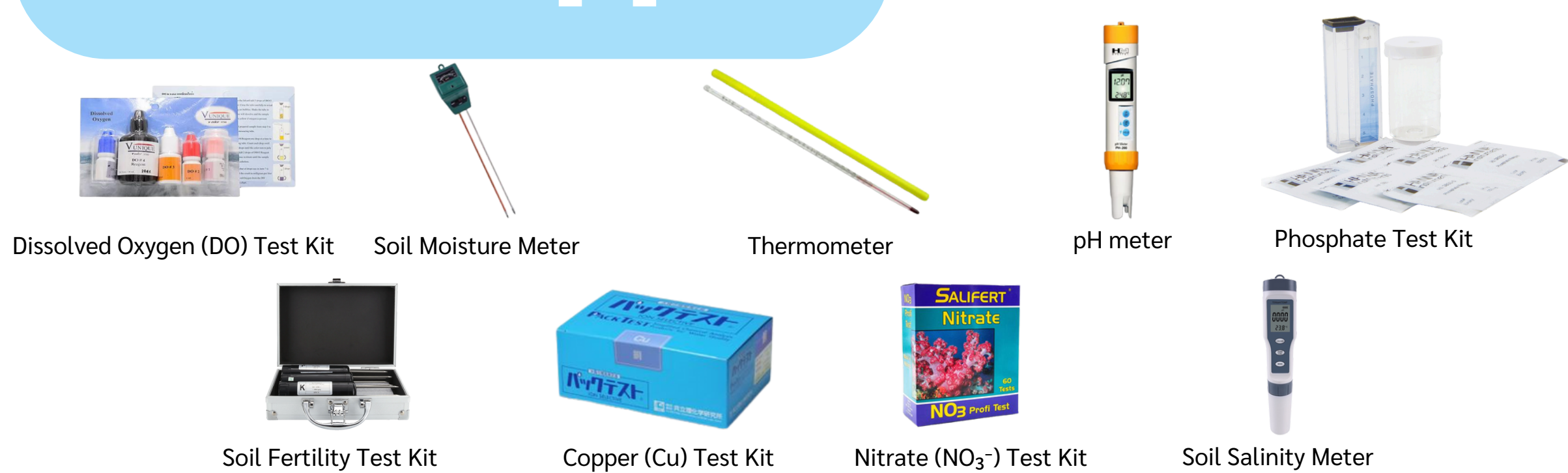
- Soil quality contributes to increased contaminant concentrations in potable water due to the leaching of minerals and dissolved chemicals from the soil.
- The mineral composition and pH levels of soil during the dry season influence the concentration of contaminants in potable water, which may lead to an improvement in groundwater quality.

The study area

At Baan Suan, 75/5, Moo 9, Khok Lo Subdistrict, Mueang District, Trang Province, 92000.



Materials and Equipment



Honorary Declaration

This project, titled "Study of Soil Quality in Different Seasons and Its Impact on the Quality of Potable Water," conducted at Baan Suan, 75/5 Moo 9, Khok Lo Subdistrict, Mueang District, Trang Province, 92000, has been successfully completed with great appreciation and support from Mr. Sakda Paisomboon, the Director of Wichiamatu School for his support. We also sincerely thank Dr. Jiraporn Sirirat, the project advisor for her guidance and continuous assistance in improving and refining this project until its completion.

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Research results

Details of soil sample preservation and analysis

Figure 1 shows the results of the analysis of temperature, soil moisture, pH, salinity, and soil fertility (NPK) at Ban Suan 75/5, Khok Lor Subdistrict, Mueang District, Trang Province.

Parameter	Average Temperature /Soil Humidity/pH (Acidity/Alkalinity) /Soil Salinity/N, P, K (Nitrogen, Phosphorus, Potassium)					
	10 cm		20 cm		Average	
	Rainy season	Summer	Rainy season	Summer	Rainy season	Summer
Temperature (°C)	25.75	27.25	26.5	24.5	25.5	25
Soil Moisture	5.75	1	3.375	2.13	2	2.07
pH Level	7.3	7.73	7.515	7.07	7.66	7.37
Salinity (ppm)	89	69.5	69.25	66.5	67.63	67.07
N	0.38	5	2.69	0.75	3	1.88
P	0.38	6	3.19	0.25	3.38	1.82
K	2.25	4.63	3.44	1.38	10.38	5.88

Physical and Chemical Quality of Groundwater and Filtered Water

Parameter	Quality of groundwater used for domestic purposes		Average
	Rainy season	Summer	
Temperature (°C)	26	26	26
pH (Acidity/Alkalinity) (pH)	6.39	6.73	6.56
Dissolved Oxygen (DO)	2	3.75	2.88
Copper (Cu)	1	1	1
Nitrate (NO ₃ ⁻)	1	0	0.5
Phosphate (PO ₄ ³⁻)	1.5	0.1	0.8
Iron (Fe)	0.75	0.5	0.63

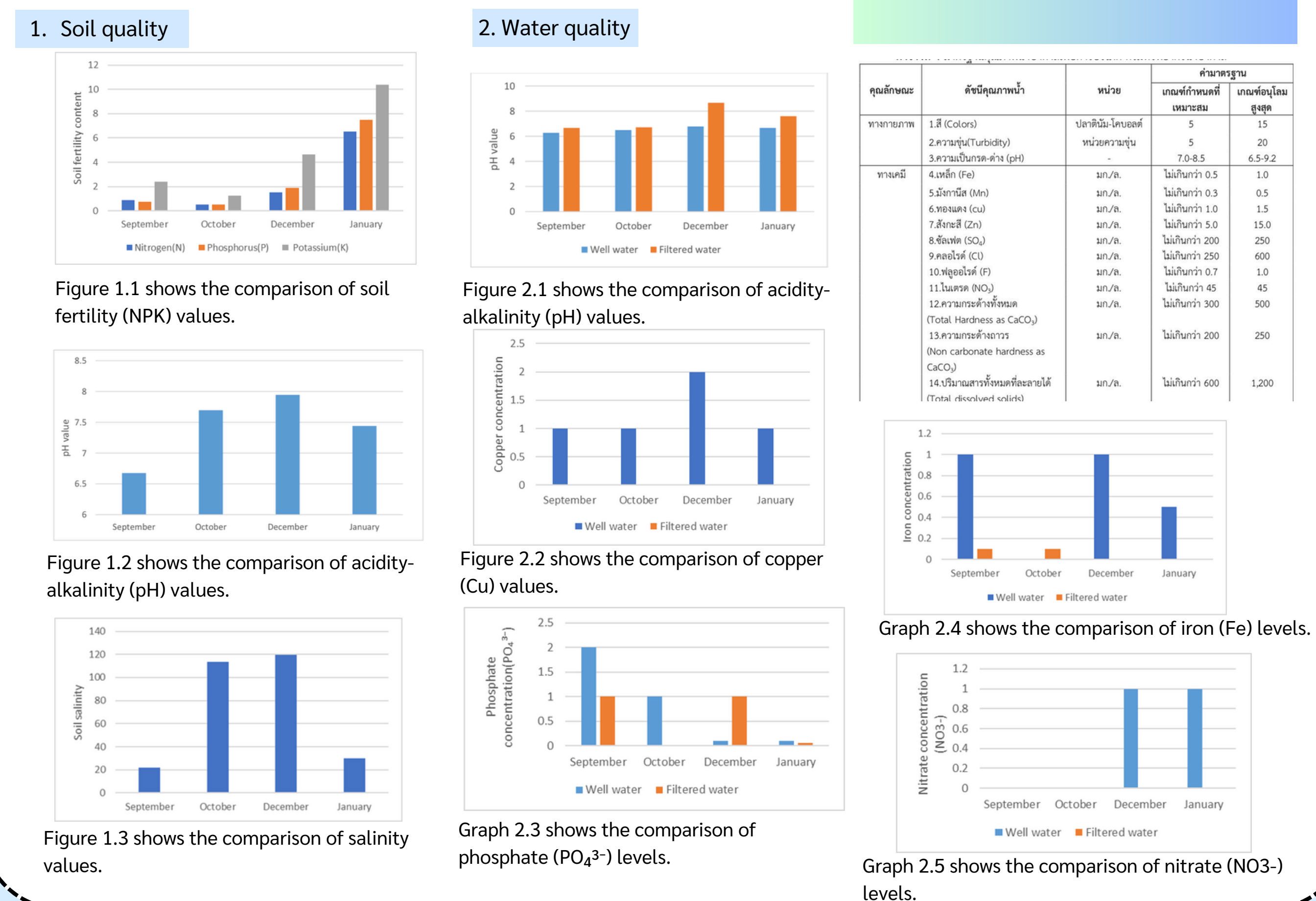
Figure 2 shows the results of the physical and chemical analysis of water quality for consumption at Ban Suan 75/5, Khok Lor Subdistrict, Mueang District, Trang Province.

Parameter	Quality of filtered water used for consumption		Average
	Rainy season	Summer	
Temperature (°C)	28	28.5	28.26
pH (Acidity/Alkalinity) (pH)	6.58	8.13	7.36
Dissolved Oxygen (DO)	6	6.75	6.38
Copper (Cu)	0	0	0
Nitrate (NO ₃ ⁻)	0	0	0
Phosphate (PO ₄ ³⁻)	0.5	0.53	0.52
Iron (Fe)	1	0	0.5

Figure 3 shows the results of the physical and chemical analysis of water quality for consumption at Ban Suan 75/5, Khok Lor Subdistrict, Mueang District, Trang Province.

The graph shows a comparison of water and soil quality analysis across different seasons.

Table shows criteria and standards for groundwater quality for consumption



Summary and Discussion of Research Findings

The physical quality of water includes an average pH of 6.73 and electrical conductivity of 150 mS/m. Chemically, iron (Fe) averages 0.75 mg/L, exceeding domestic groundwater standards (Ministry of Industry Notification No. 12). Filtration reduces Fe levels, ensuring compliance with groundwater quality standards for consumption.

In summer, untreated groundwater exceeds Fe standards but meets all domestic use criteria after filtration, regardless of season. Narong (1997) found higher heavy metal concentrations in summer than in the rainy season. GPR (2001) noted that shallow groundwater rises in the rainy season due to rainwater replenishment but drops 5-6 meters in summer, leading to high-salinity seepage from deeper layers. This is evidenced by elevated salinity and electrical conductivity in shallow groundwater wells.

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