



A Study of Water Quality of Tap Water Production Sources in Ban Taphao, Ban Kheenak, and Ban Hat Areas

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Research Title : A Study of Water Quality of Tap Water Production Sources in Ban Taphao, Ban Kheenak, and Ban Hat Areas

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Abstract

This research aims to study the water quality of tap water sources in Ban Tapao, Ban Khee Nak, and Ban Hat areas. The study analyzes the impact of physical and chemical factors on water quality, leading to water management planning, water resource conservation, and raising community awareness of the importance of shared water resources for proper and appropriate water allocation. Water samples were collected from three locations: Point 1: Tapao community water well; Point 2: Khee Nak community water well; and Point 3: Ban Hat community water well. Each sample was collected once. Water quality parameters measured included water temperature, electrical conductivity, dissolved oxygen, pH, nitrate, and nitrite. The research results showed that at Point 1, the tap water well in the Tapao community... The average water temperature at point 1 was 30°C, pH 7.37, nitrate levels 0–1 (mg/L), nitrite levels 0–1 (mg/L), electrical conductivity (EC) 206 (µg/L), and dissolved oxygen (DO) 5.5 (mg/L). Point 2, the community water supply well in Ban Khee Nak, had an average water temperature of 28°C, pH 7.83, nitrate levels 0–1 (mg/L), nitrite levels 0–1 (mg/L), electrical conductivity (EC) 112 (µg/L), and dissolved oxygen (DO) 8.0 (mg/L). Point 3 was the community water supply well in Ban Hat. The average water temperature was 29°C, pH 7.24, nitrate level 0–1 (mg/L), nitrite level 0–1 (mg/L), electrical conductivity (EC) 114 (µg/L), and dissolved oxygen (DO) 3.0 (mg/L).

From the test results, it can be seen that all three water sources studied are suitable for consumption and domestic use. They are classified as Type 2 water, according to the National Environmental Board Announcement No. 8 of 1994. This indicates that the water quality is suitable for agricultural consumption and wildlife conservation, meeting the standards for tap water production.

Keywords Water quality, Parameters

Introduction of Literature

The quality of tap water is also related to public confidence in the water service provider. If tap water exhibits sensory or physical irregularities, such as an unpleasant odor, color, or taste, people may avoid using it for consumption and switch to water from other sources that may not have undergone proper quality control, which may pose a greater health risk. Therefore, regular monitoring and control of tap water quality is crucial. Tap water quality can be checked by analyzing physical, chemical, and biological parameters such as pH, nitrate, nitrite, electrical conductivity, and dissolved oxygen, which may cause illness. These values can be used as indicators of the safety and suitability of tap water for daily use. Thus, studying tap water quality in different areas plays a significant role in reflecting the efficiency of water production and management systems in each community. Furthermore, the results of the study can be used to improve water production processes, water treatment, and the maintenance of water supply systems to meet established standards, which will promote good health and quality of life for the public in the long term. Moreover, tap water quality has an economic and social impact on the community. If tap water is of poor quality, people have to incur additional costs for installing household water filtration systems, which is an unnecessary added expense. Especially in low-income households, educational institutions, hospitals, and various businesses rely on quality tap water for their operations. If tap water fails to comply with established quality standards, it can affect service provision and user safety. Currently, environmental conditions and urban expansion are causing natural water sources to be increasingly affected by human activities, such as the discharge of wastewater from communities, industrial plants, and agriculture. This may lead to higher levels of chemical and microbial contamination in raw water used for tap water production. Therefore, continuous monitoring and evaluation of tap water quality are essential to enable timely monitoring and resolution of problems.

For these reasons, this study is important in analyzing and comparing data obtained from tap water quality measurements with the standards for drinking water. This will help to understand the tap water quality situation in the study area and can be used as a guideline for developing a more efficient and safer tap water management system for the public.

Research Questions

What is the quality of tap water in the communities of Ban Taphao, Ban Khee Nak, and Ban Hat? Does it meet the standards?

Research Hypothesis

The water quality from community water sources in Ban Tapao, Ban Khee Nak, and Ban Hat varies, and the water quality from these sources meets the standards.

Research Methods and Materials

1. Glass tube thermometer



(Figure 1. Glass rod thermometer)

2. LabQuest & pH Meter



(Figure 2. LabQuest & pH Meter)

3. TDS&EC



Figure 3. TDS&EC

4. A kit for measuring dissolved oxygen in water.



Figure 4. A kit for measuring dissolved oxygen in water

5. Water quality test strips



Figure 5. Water quality test strips

6. Measuring cylinder



Figure 6. Measuring cylinder

7. Beaker



Figure 7. Beaker

8. Mobile phone 9. Google Maps 10. Pencil and pen 11. Sample bottle

Scope of study

1) Scope of content

To study the quality of tap water from community water treatment plants in Ban Tapao, Ban Khee Nak, and Ban Hat, To study the physical, chemical, and biological characteristics of water quality, considering indicators such as pH, nitrate, nitrite, electrical conductivity (EC), and dissolved oxygen (DO), To compare the water quality of each water treatment plant with the standard criteria for drinking water, To analyze the differences in water quality between the three community water treatment plants.

2) Scope in terms of location.

Water sampling and measurements were conducted in three villages within Sisaket Province, Water quality was measured at PhakMaiWittayanukul School, Huai Thap Than District, Sisaket Province.

3) Time scope

The project ran from January 16-28, 2026.

Research Methods

1. Defining study points

Three study points were identified in the areas of Ban Taphao, Ban Khin Nak, and Ban Hat. These points were then divided into smaller study sections.

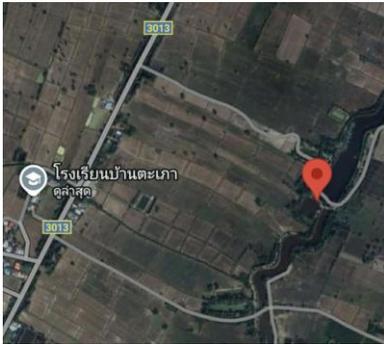


Figure 7. Water supply well at Ban Taphao, Tum Subdistrict, Prang Ku District, Sisaket Province.

Location: 14.899170, 104.015294



Figure 8. Water supply well at Ban Khee Nak, Tum Subdistrict, Prang Ku District, Sisaket Province.

Location: 14.917374, 104.028202

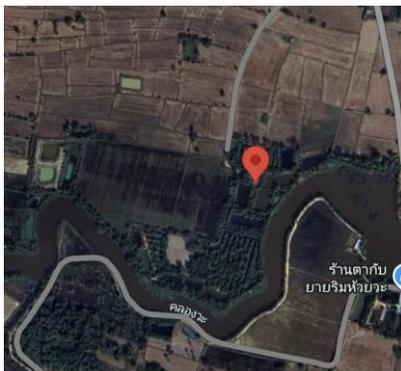


Figure 9. Water supply well at Ban Hat, Phak Mai Subdistrict, Huai Thap Than District, Sisaket Province.

Location: 14.929397, 104.037632

2. Conduct a field survey



Figure 10. Conduct a field survey

3. Collect a water sample and measure the water temperature

Identify and designate the specific study areas. Fill the bottle with water to a depth of 30 centimeters and tightly close the lid underwater. Ensure the sample bottle is airtight and free of trapped air bubbles.

4. Measuring various parameters in the water.

4.1) Measure the pH of water using a LabQuest pH Meter.

Pour water samples from the tap water source into a beaker. Use the LabQuest pH Meter to measure the pH value. Measure all three sources and record the pH results.

4.2) Measure the Nitrate and Nitrite content of water using water quality test strips.

Pour water samples from the tap water source into a measuring cylinder. Dip the water quality test strip into the measuring cylinder containing the water sample. Remove it and wait 30 seconds. After the time is up, compare the tested water quality test strip to the color chart and record the result.

4.3) Measure the Electrical Conductivity (EC) of water using a TDS&EC meter.

Pour water samples from the tap water source into a beaker. Use the TDS&EC meter to measure the electrical conductivity. Measure all three sources and record the electrical conductivity results.

4.4) Measure the Dissolved Oxygen (DO) level of the water using a dissolved oxygen test kit.

Rinse the sample container underwater 2-3 times, then fill it with water. Close the lid underwater to prevent air from entering, being careful to avoid air bubbles. Open the lid, add 2 drops of reagent #1, then add 2 drops of reagent #2, and close the lid, being careful to avoid air bubbles. Shake while the lid is closed. A yellowish-brown precipitate will form, indicating the presence of oxygen. Wait for the precipitate to settle to about half the container. Open the lid, add 5 drops of reagent #3 to the sample, and close the lid, being careful to avoid air entry. Shake well and wait until the precipitate is completely dissolved and the sample turns yellow. Pour the sample from step 5 into a new test tube until it reaches the 5 ml mark. Add reagent #4 drop by drop, shaking well and counting the number of drops used. When the sample color starts to fade to yellow, add 2 drops of reagent #5. The sample will turn blue. Continue adding reagent #4, counting the drops, until the sample water becomes colorless. Read the counted number of drops to see the result. It is milligrams per liter of oxygen from the table.

Drops used	DO (mg/L)	Drops used	DO (mg/L)
1	0.5	16	8.0
2	1.0	17	8.5
3	1.5	18	9.0
4	2.0	19	9.5
5	2.5	20	10.0
6	3.0	21	10.5
7	3.5	22	11.0
8	4.0	23	11.5
9	4.5	24	12.0
10	5.0	25	12.5
11	5.5	26	13.0
12	6.0	27	13.5
13	6.5	28	14.0
14	7.0	29	14.5
15	7.5	30	15

Figure 11. Table for estimating dissolved oxygen in water.

4.5) Enter the recorded values for pH, Nitrate, Nitrite, Electrical Conductivity, and Dissolved

Oxygen into the table and compare them to the standards set by the Department of Water Pollution Control.

4.6) Submit the data to the Data Entry system or via the GLOBE Observer App.

Research results

Water samples were collected from the three studied tap water sources on January 16, 2026. pH, nitrate, nitrite, electrical conductivity, and dissolved oxygen levels were measured on January 19, 2026, and compared to the standards set by the Pollution Control Department. The results are as follows:

Table 1. Results of pH, Nitrate, Nitrite, Electrical Conductivity, and Dissolved Oxygen measurements of tap water sources in Ban Tapao, Ban Khin Nak, and Ban Hat communities.

Community water supply source.	Water temperature	pH	Nitrate (mg/L)	Nitrite (mg/L)	Electrical Conductivity (μ S/cm)	Dissolved Oxygen (mg/L)
Ban Taphao Community	30	7.37	0 - 1	0 - 1	206	5.5
Ban Khee Nak Community	28	7.83	0 - 1	0 - 1	112	8.0
Ban Hat Community	29	7.24	0 - 1	0 - 1	114	3.0

Table 1 shows the values for pH, Nitrate, Nitrite, Electrical Conductivity, and Dissolved Oxygen. The tap water in Ban Tapao community had an average water temperature of 30 °C, a pH of 7.37, an electrical conductivity (EC) of 206 (μ g/L), a nitrate value of 0–1 (mg/L), a nitrite value of 0–1 (mg/L), and a dissolved oxygen (DO) value of 5.5 (mg/L). In Ban Khee nak community, the average water temperature was 28 °C, with a pH of 7.83, an electrical conductivity (EC) of 112 (μ g/L), a nitrate value of 0–1 (mg/L), a nitrite value of 0–1 (mg/L), and a dissolved oxygen (DO) value of 8.0 (mg/L). Finally, in Ban Hat community, the tap water... The average water temperature was 29 °C, pH 7.24, electrical conductivity (EC) 114 (μ g/L), nitrate 0–1 (mg/L), nitrite 0–1 (mg/L), and dissolved oxygen (DO) 3.0 (mg/L).

Table 2. Comparative standards for tap water quality

Parameter	Unit	Water quality standards
pH	-	6.5 - 8.5
Nitrate	(mg/L)	≤ 50
Nitrite	(mg/L)	≤ 3
Electrical Conductivity	($\mu\text{g/L}$)	100 – 800
Dissolved Oxygen	(mg/L)	5.0 – 8.0

Table 2 shows the standard values for tap water quality. It was found that the pH standard must be between 6.5–8.5 to be considered neutral to slightly alkaline and generally suitable for consumption. The nitrate standard must not exceed 50 (mg/L); exceeding 50 (mg/L) is dangerous for consumption. The nitrite standard must not exceed 3 (mg/L); exceeding 3 (mg/L) is harmful to health and indicates contamination with sewage, waste, and agricultural wastewater. The electrical conductivity (EC) standard must be between 100–800 ($\mu\text{g/L}$) to control the amount of dissolved substances in the water at an appropriate level and not affect consumption. The dissolved oxygen (DO) standard must be between 5.0–8.0 (mg/L) to allow living organisms to survive, prevent water spoilage, and maintain ecological balance.

Summary and discussion of research findings

A study of water quality in community water supply sources in Ban Tapao, Ban Khee nak, and Ban Hat villages, conducted from January 16-26, 2026, in Tum Subdistrict, Prang Ku District, and Phak Mai Subdistrict, Huai Thap Than District, Sisaket Province, revealed the following results for pH, nitrate, nitrite, electrical conductivity, and dissolved oxygen:

The pH of tap water in Ban Tapao village was 7.37, in Ban Khee nak village it was 7.83, and in Ban Hat village it was 7.24. Therefore, the pH of the tap water in all three communities is within the established standards.

The nitrate levels measured in tap water in Ban Tapao community were between 0 and 1 mg/L. The nitrate levels in Ban Khee nak community were also between 0 and 1 mg/L. The nitrate levels in Ban Hat community were also between 0 and 1 mg/L. Therefore, the nitrate levels in the tap water of all three communities are within the established standard limits.

The nitrite levels measured in tap water in Ban Tapao community were also between 0 and 1 mg/L. The nitrite levels in Ban Khee nak community were also between 0 and 1 mg/L. The nitrite levels in the tap water of all three communities are also between 0 and 1 mg/L. Therefore, the nitrate levels in the tap water of all three communities are within the established standard limits.

The electrical conductivity measurements of tap water in Ban Tapao community showed a value of 206 ($\mu\text{g/L}$), in Ban Khee nak community a value of 112 ($\mu\text{g/L}$), and in Ban Hat community a value of 114 ($\mu\text{g/L}$). Therefore, the electrical conductivity values of the tap water in all three communities are within the established standard.

The dissolved oxygen measurements of tap water in Ban Tapao community showed a value of 5.5 (mg/L), in Ban Khee nak community a value of 8.0 (mg/L), and in Ban Hat community a value of 3.0 (mg/L). The study found that the dissolved oxygen values of tap water in Ban Tapao and Ban Khee nak communities were within the established standard, but the dissolved oxygen value of tap water in Ban Hat community was lower than the established standard.

This study examines the quality of tap water in Ban Tapao community. Water quality tests conducted in Ban Khee Nak and Ban Hat communities between January 16-26, 2026, revealed that the pH, nitrate, nitrite, and electrical conductivity of the tap water in all three communities met the standard criteria. This indicates that the water quality is suitable according to the established standards. However, the dissolved oxygen levels in Ban Tapao and Ban Khee Nak communities were within the standard range, but the dissolved oxygen level in Ban Hat was below the standard.

Suggestions

1. Regularly monitor water quality.

Regularly check water quality parameters such as pH, nitrate, nitrite, electrical conductivity, and dissolved oxygen to prevent health problems in the community.

2. Maintain and care for water sources and plumbing systems.

Regularly clean water tanks and repair damaged pipes to prevent contamination.

3. Promote community participation.

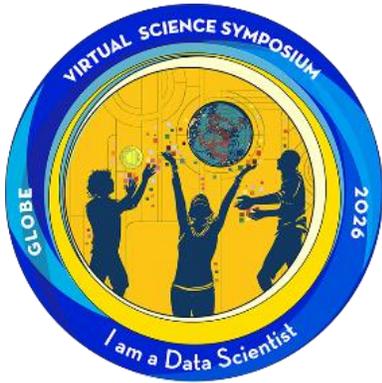
Encourage the community to help maintain water sources, prevent the dumping of garbage or chemicals into water, and educate them about water conservation.

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Research question sign

1. I AM A DATA SCIENTIST



A study of community tap water quality in Ban Tapao, Ban Khin Nak, and Ban Hat, using field measurements combined with GLOBE database data, revealed that pH, nitrate, nitrite, and electrical conductivity values in all three communities were within standard limits. This indicates that the tap water is of suitable quality for consumption overall. However, the dissolved oxygen (DO) level in Ban Hat community was below standard, which may be due to differences in the raw water source. Nevertheless, the study has limitations in terms of time frame and sample size. Therefore, continuous monitoring is needed to improve the accuracy of the water quality assessment.

2. I AM A COLLABORATOR



A study of tap water quality in Ban Tapao, Ban Khee Nak, and Ban Hat communities was conducted from January 16–26, 2026, by a research team composed of members with diverse roles and clearly defined responsibilities, working collaboratively and systematically. Some members were responsible for collecting water samples and measuring water quality parameters such as pH, nitrate, nitrite, electrical conductivity, and dissolved oxygen, while others analyzed the data, compared results against standards, and summarized the findings. Furthermore, the research team

collaborated with external agencies and individuals for technical advice and the use of analytical instruments, which enhanced the accuracy, reliability, and completeness of the research results. This collaboration allowed the tap water quality study in the three communities to accurately reflect the water quality conditions and lead to conclusions beneficial to community water management in the study area.

3. I AM A STEM STORYTELLER



This research aimed to study the quality of tap water in the communities of Ban Tapao, Ban Khee Nak, and Ban Hat. Key water quality parameters measured included pH, nitrate, nitrite, electrical conductivity, and dissolved oxygen. The results were then compared to water quality standards to assess the suitability of the tap water for consumption by the residents in the study area. The research findings reflect the current water quality situation in all three communities and can be used as a guideline for

planning, improving, developing, and continuously monitoring the community water supply system. This ensures that residents have access to safe and high-quality water and promotes sustainable water resource management in the long term.