



Assessment of Water Quality from Natural Sources in Ban Mae Tao Din and Ban Huai Kaew, Huai Kaew Subdistrict, Mae On District, Chiang Mai Province, Thailand

**Authors : Master Apiwich Boonmak MasterThanakit Ekalaksananan Master Eunwoo Kim
Master Nuntin Sammuenkham Miss Anyada Maliwan Miss Yuna Kumada**

Advisor : Miss Panisa Tongkamgirato Miss Sirinya Tualue Miss Panita Chenrukmatupoom

Abstract

This study investigated the quality of drinking water from natural sources in Ban Mae Tao Din and Ban Huai Kaew, Huai Kaew Subdistrict, Mae On District, Chiang Mai Province, which are utilized by the local community for domestic and agricultural purposes. Water samples were collected from three sources—two groundwater sites and mountain runoff—during three periods between August 2025 and January 2026, covering both rainy and winter seasons. Physical and chemical parameters analyzed included pH, Total Dissolved Solids (TDS), ammonia, and nitrate, using standard instruments. The results showed that all water sources were clear, odorless, and free from contamination, with pH and TDS values within acceptable limits and no detection of ammonia or nitrate. Overall, the findings confirm that the natural water sources in the study area are safe for consumption and provide baseline information for community-based water resource management, supporting sustainable development goals (SDGs) in public health and environmental sustainability.

Objectives

- 1.To study the physical quality of drinking water from natural water sources in Ban Mae Tao Din, Ban Huai Kaew (SDG 4)
- 2.To compare the measured water quality parameters with the drinking water standards of the Ministry of Public Health.
- 3.To propose guidelines for improving water quality to ensure safe consumption and to promote sustainable community-based management and conservation of local water resources (SDG 12).

Research Questions

- 1.Does the quality of water from natural water sources in Ban Mae Tao Din meet safety requirements and comply with drinking water standards?
- 2.Do seasonal and environmental factors affect changes in water quality, and how do these changes influence its suitability for consumption?

Materials and Equipment

- 1.Water quality test kits for ammonia and nitrate determination
- 2.Water quality measuring instruments (pH meter, TDS & ED meters)
- 3.Thailand's National Drinking Water Standards Manual
- 4.Water samples collected from two villages:
Village No. 4, Ban Mae Tao Din: groundwater and mountain spring water (samples collected at upstream, midstream, and downstream points)
Village No. 5, Ban Huai Kaew: groundwater, located in Huai Kaew Subdistrict, Mae On District, Chiang Mai Province
- 5.Glass sampling bottles with a capacity of 1,000 cc, sealed with rubber stoppers
- 6.Distilled water
- 7.Data recording sheets for water sample collection



References

Mae Fah Luang University Institutional Repository. (n.d.). Water supply quality and health impacts on hill tribe people: A case study of the Akha hill tribe village, Chiang Rai, Thailand. Retrieved January 24, 2026, from <https://mfuir.mfu.ac.th/jspui/handle/123456789/1116>

Research Methodology

The study area was defined at three locations as follows:
Location 1: Village No. 5, groundwater source (Suan Phueng), Ban Huai Kaew, Huai Kaew Subdistrict, Mae On District, Chiang Mai Province.

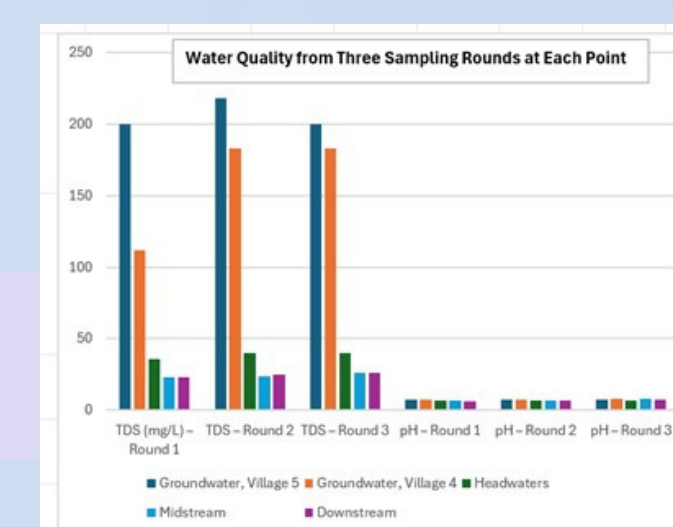
Location 2: Village No. 4, groundwater source, Ban Mae Tao Din, Huai Kaew Subdistrict, Mae On District, Chiang Mai Province.

Location 3: Village No. 4, mountain runoff water (upstream, midstream, and downstream), Ban Mae Tao Din, Huai Kaew Subdistrict, Mae On District, Chiang Mai Province.

At each location, a total of 5 liters of water samples were collected for analysis of physical and chemical water properties. Water samples from each source were collected three times during the rainy and dry seasons. The sampling dates were as follows:

- First sampling: 2 August 2025
- Second sampling: 28 September 2025
- Third sampling: 18 January 2026

Data collection and analysis included the determination of ammonia and nitrate concentrations, as well as measurements of pH and Total Dissolved Solids (TDS) using standard water quality measuring instruments.



Outcomes

The study revealed that the water quality from all sources and sampling periods complied with the drinking water standards of Thailand and the World Health Organization (WHO). Parameters including pH, total dissolved solids (TDS), ammonia, and nitrate were consistently within permissible limits, and no hazardous contaminants were detected. Seasonal variations were minimal, with slightly lower values observed during the rainy season due to dilution, and marginally higher mineral concentrations during the winter season, particularly in groundwater, which nevertheless remained within safe thresholds. These findings corroborate previous research and affirm that natural water sources in the study area are suitable for domestic consumption. Continuous monitoring of water quality, coupled with the active involvement of local communities, is recommended to ensure sustainable water resource management.

Conclusion

The results of this study demonstrate that the water quality from all investigated sources consistently met the drinking water standards of Thailand and the World Health Organization (WHO). Parameters including pH, total dissolved solids (TDS), ammonia, and nitrate remained within safe limits, with no harmful contaminants detected. Seasonal variations were minimal, with dilution effects observed during the rainy season and slightly elevated mineral concentrations in groundwater during the winter season, both of which remained within acceptable thresholds. Overall, the findings confirm that natural water sources in the study area are safe and suitable for domestic consumption. These results are consistent with previous research and highlight the importance of continuous monitoring to ensure long-term water safety. Furthermore, community participation in water resource management should be encouraged to promote sustainable practices and safeguard local water supplies for future generations.

Thailand Research Fund. (2011). Community-based water resource management: The role of participatory action research in Lampang, Northern Thailand. Retrieved January 24, 2026, from https://elibrary.tsri.or.th/fullP/RDG54N0009/RDG54N0009_full.pdf