



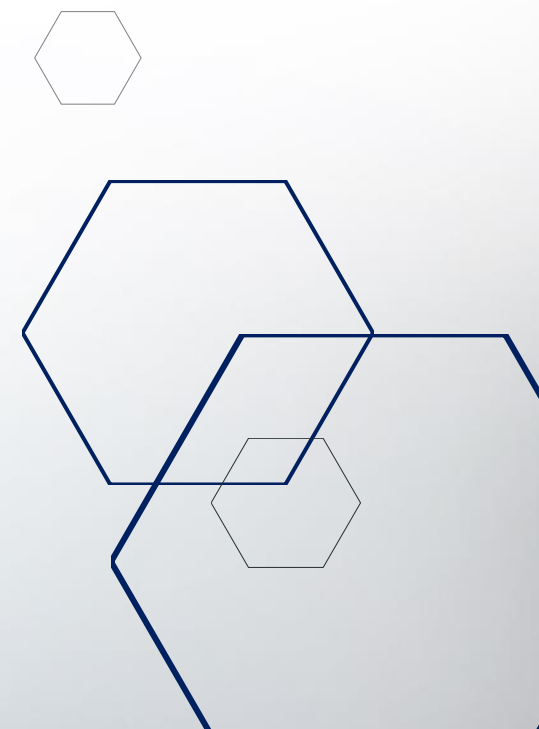
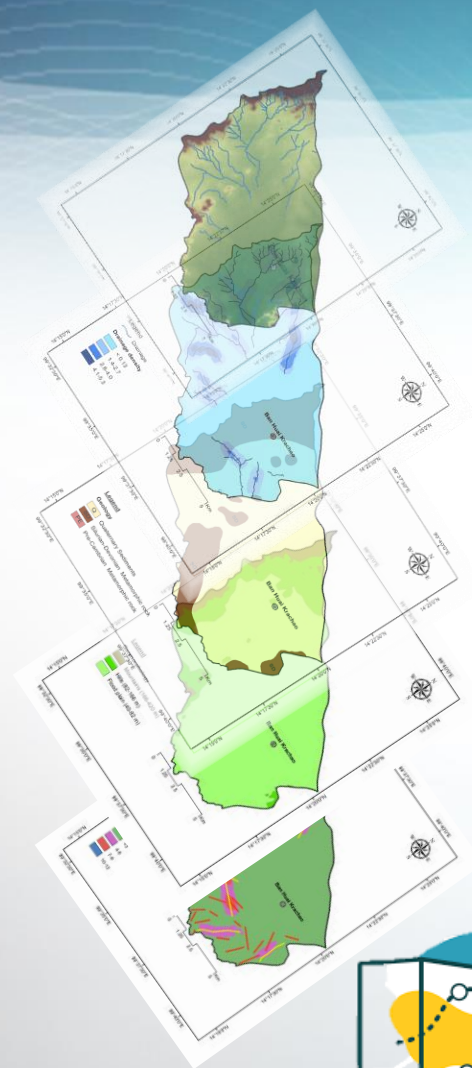
GIS ANALYSIS FOR GROUNDWATER EXPLORATION IN HARD ROCK TERRAINS HUA KRACHAO KANCHANABURI THAILAND

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**Department of Groundwater Resources
Ministry of Natural Resources and Environment**



- **Background Information**
- **GIS Analysis for Groundwater Exploration**
- **Results**
- **Discussion**
- **Conclusions**

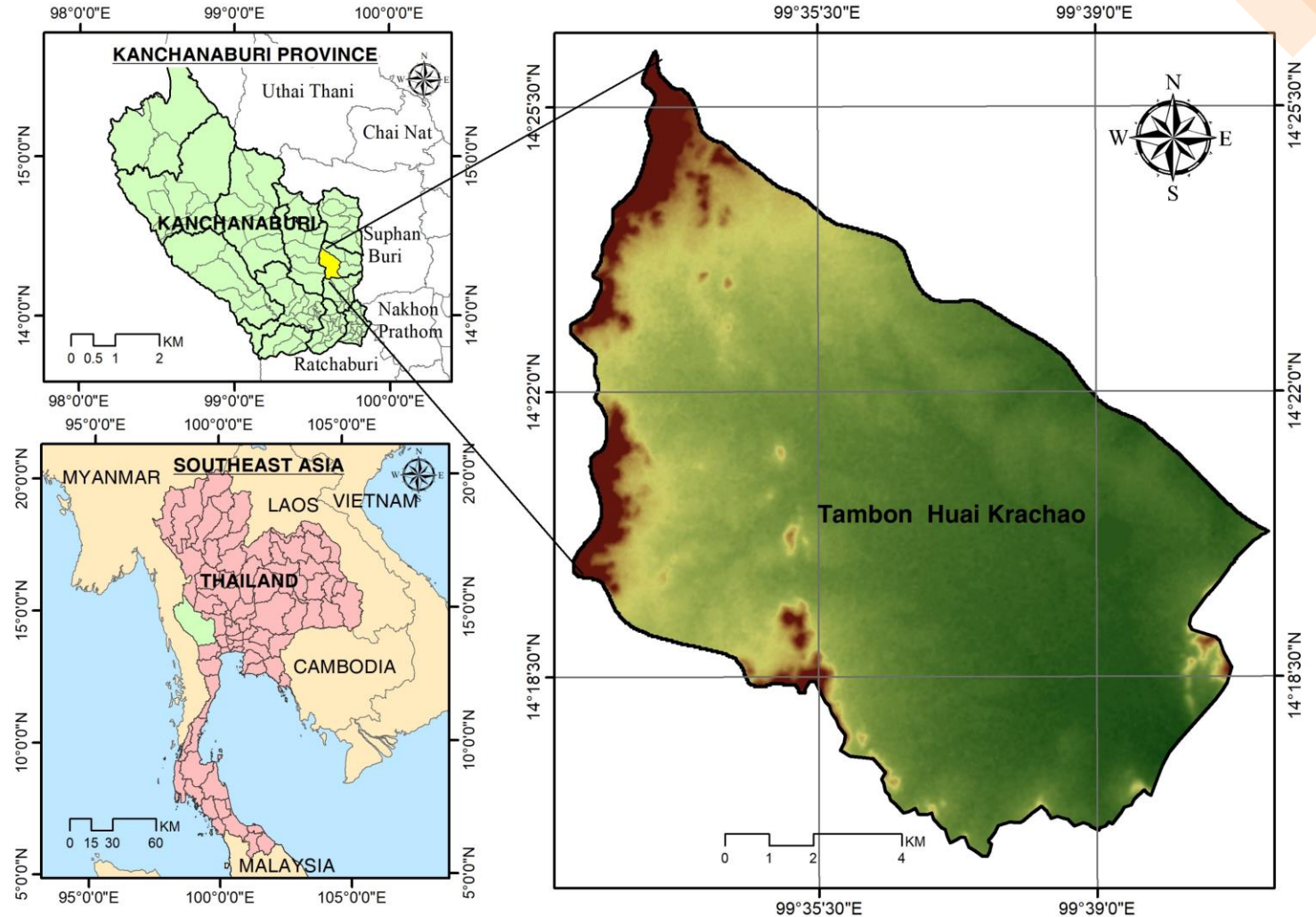


Background Information

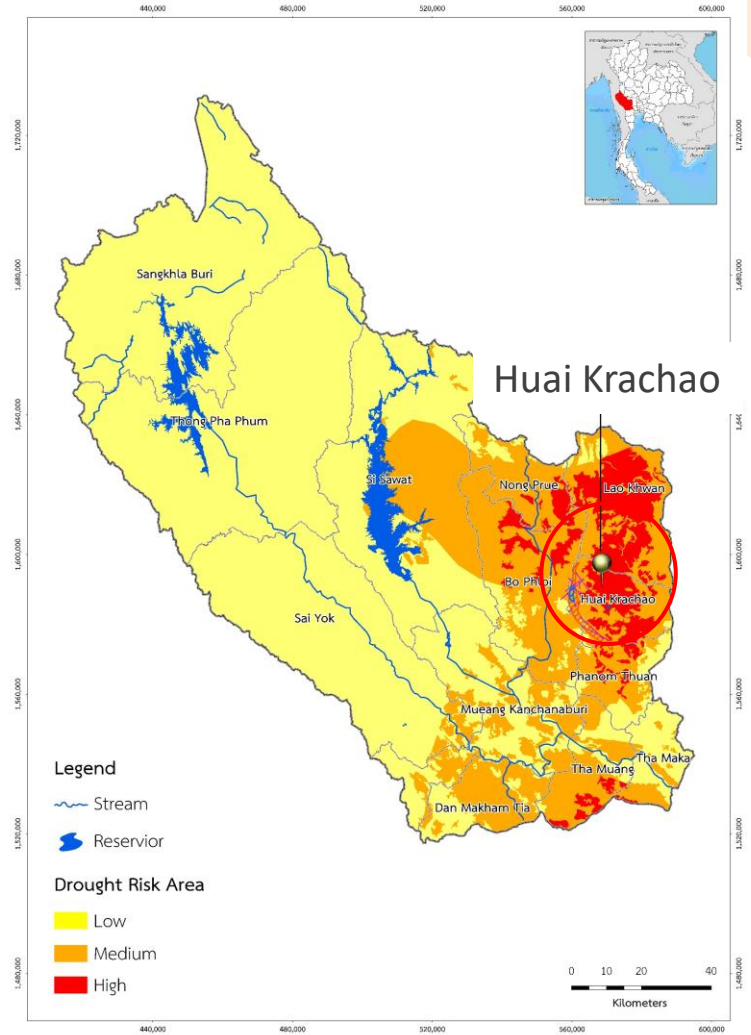
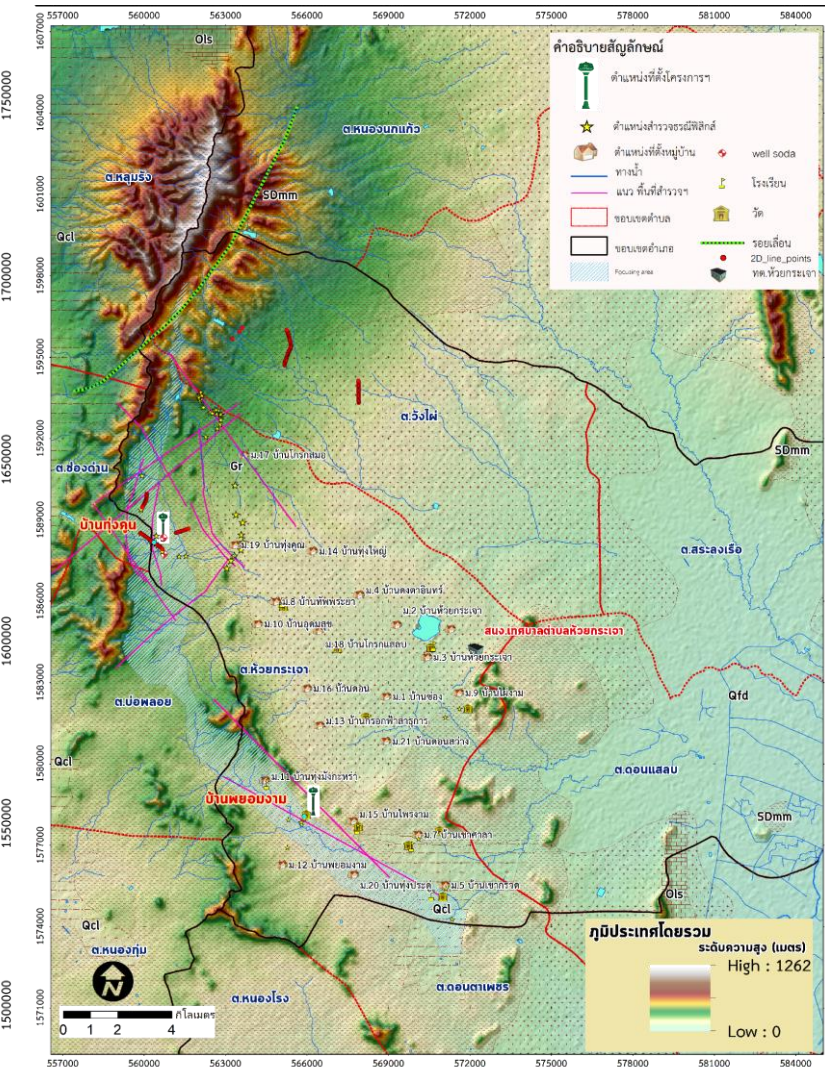
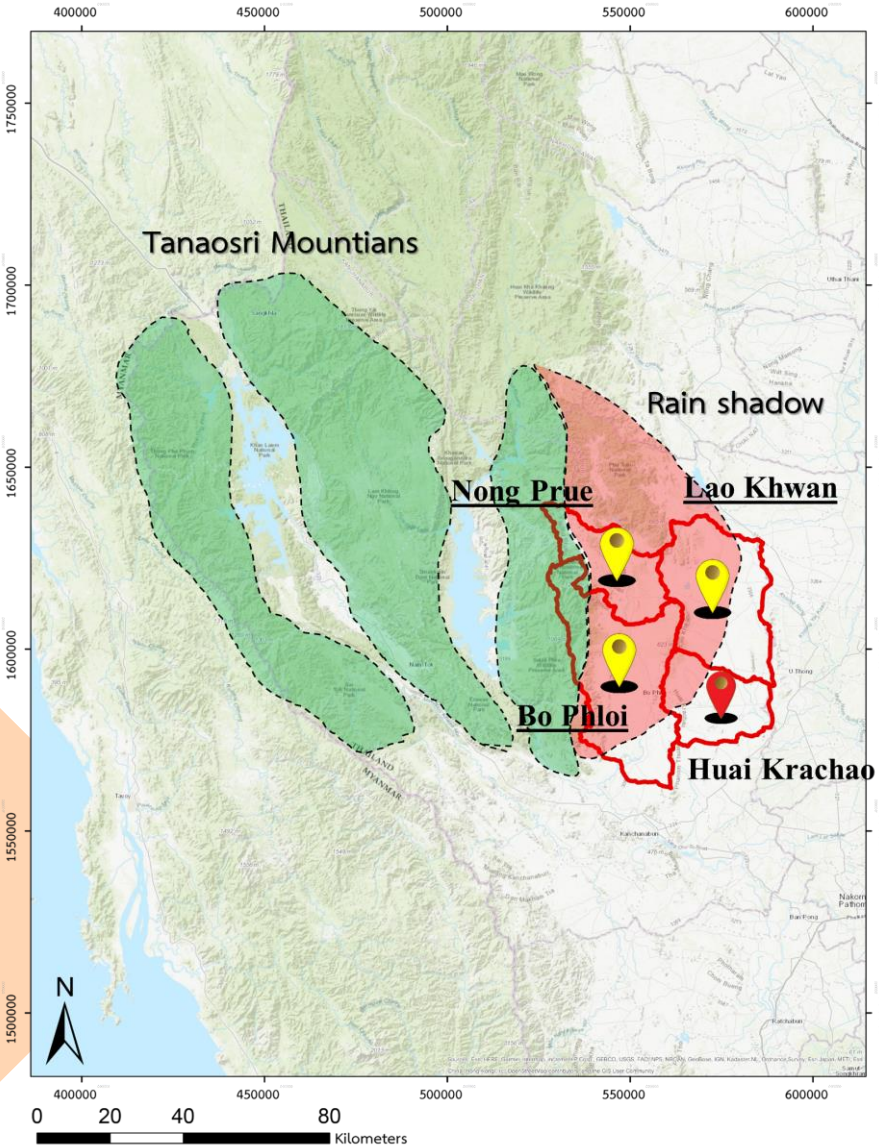


Huai Krachao Subdistrict Huai Krachao District, Kanchanaburi Province.

- Area : 150 km²
- Altitude : 50 to 150 m
- Geology : Metamorphic and Igneous rock basement complex
- Rainfall : 800-1,500 mm per year
- Population : 4,826
- Field crops : Sugarcane Cassava
- Livestock : Beef cattle Chicken farm
- Water use : Surface water



Background Information



Background Information



Water Shortage!!



800,000m³

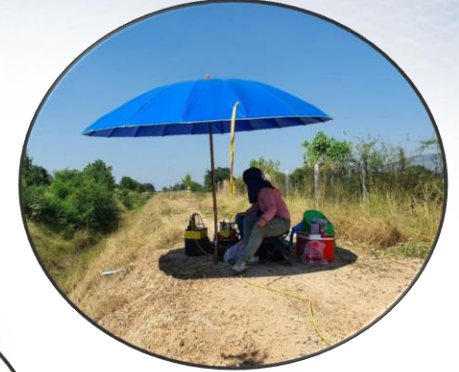
Water consumption for serving domestic uses and agricultural lands



3-6 months

Dry season (November to April)

Background Information



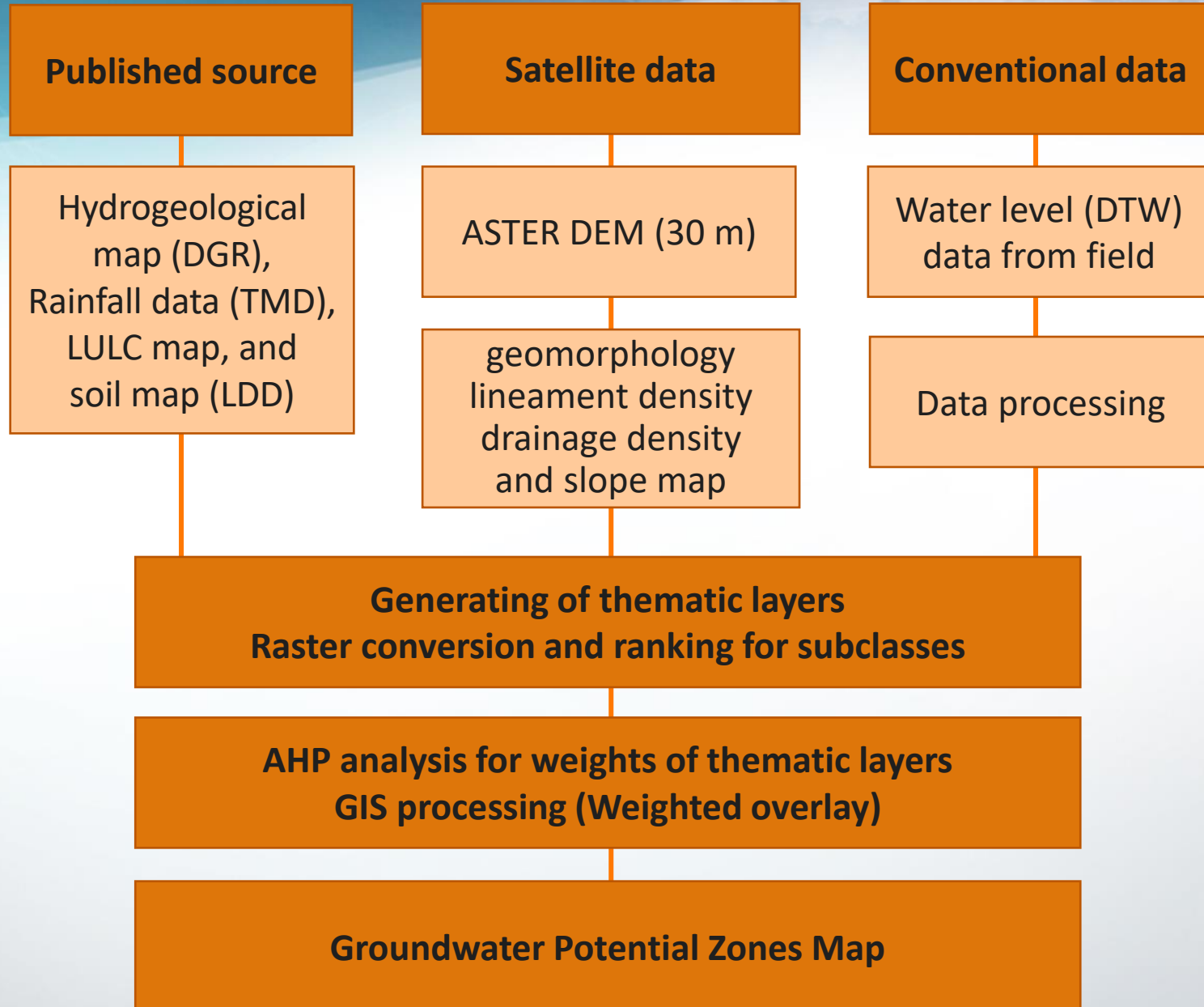
Where is Groundwater

Geological and hydrogeological field investigation geophysical survey and groundwater production and development.

GIS Analysis for groundwater exploration



Methods



GIS Analysis for groundwater exploration



9 Parameters

1. Geology (GY)
2. Geomorphology (GM)
3. Lineament Density (LD)
4. Land use and Land cover (LULC)
5. Slope (SP)
6. Soil type (SL)
7. Drainage Density (DD)
8. Rainfall (RF)
9. Groundwater Level (GWL)

Reclassify

AHP weight

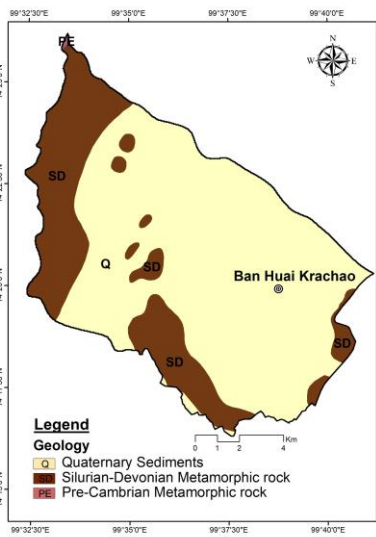
**Weighted index
overlay analysis
(WIOA)**

**Groundwater
potential index
(GWPI)**

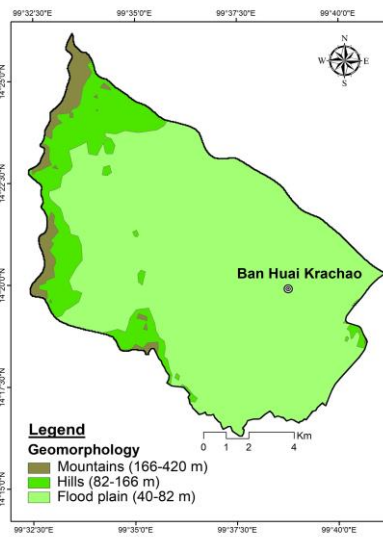


Factor Maps

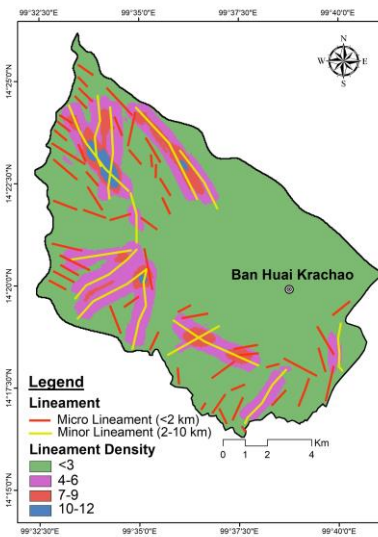
Subclasses for each thematic layer



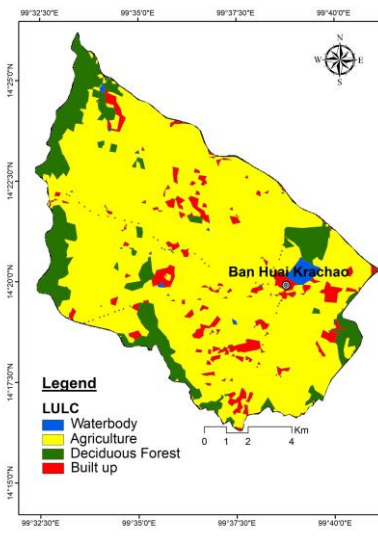
Geology



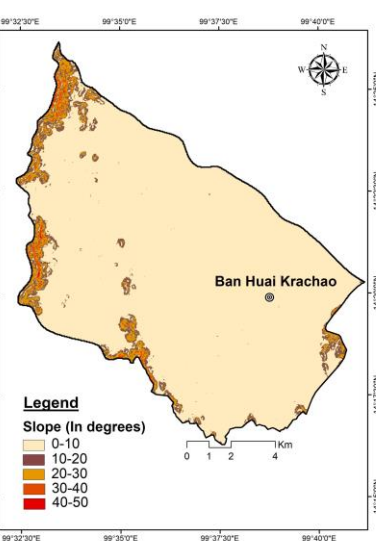
Geomorphology



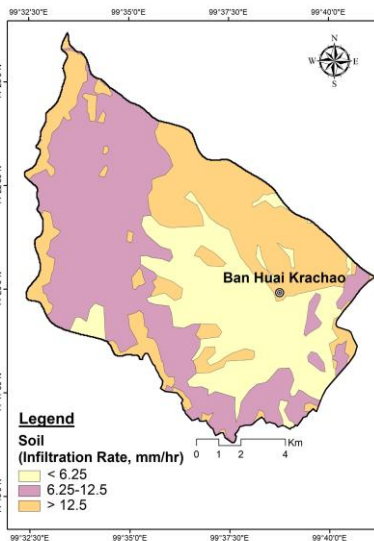
Lineament Density



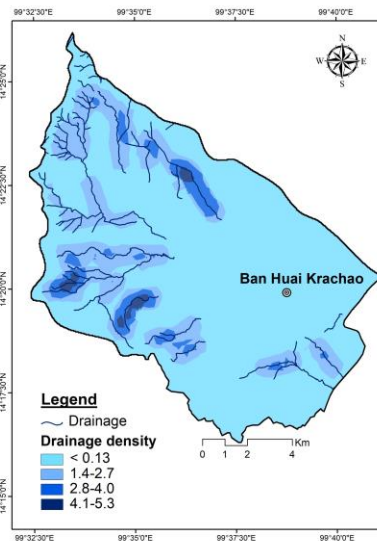
Land use and Land cover



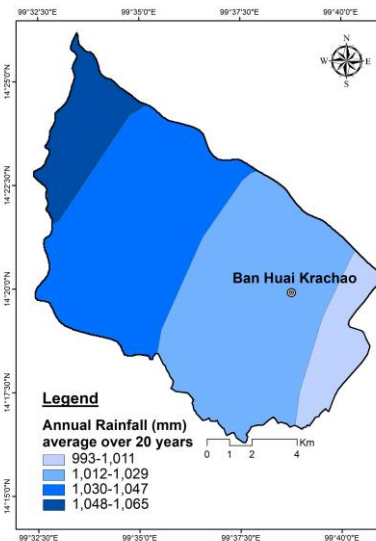
Slope



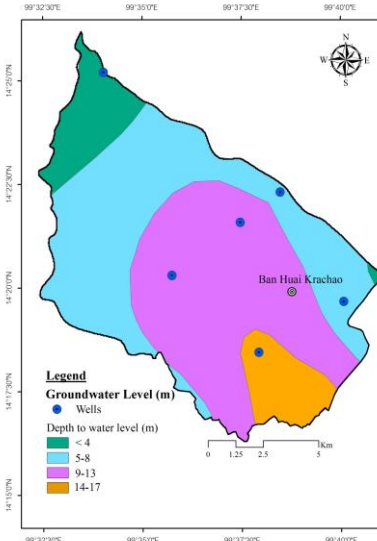
Soil



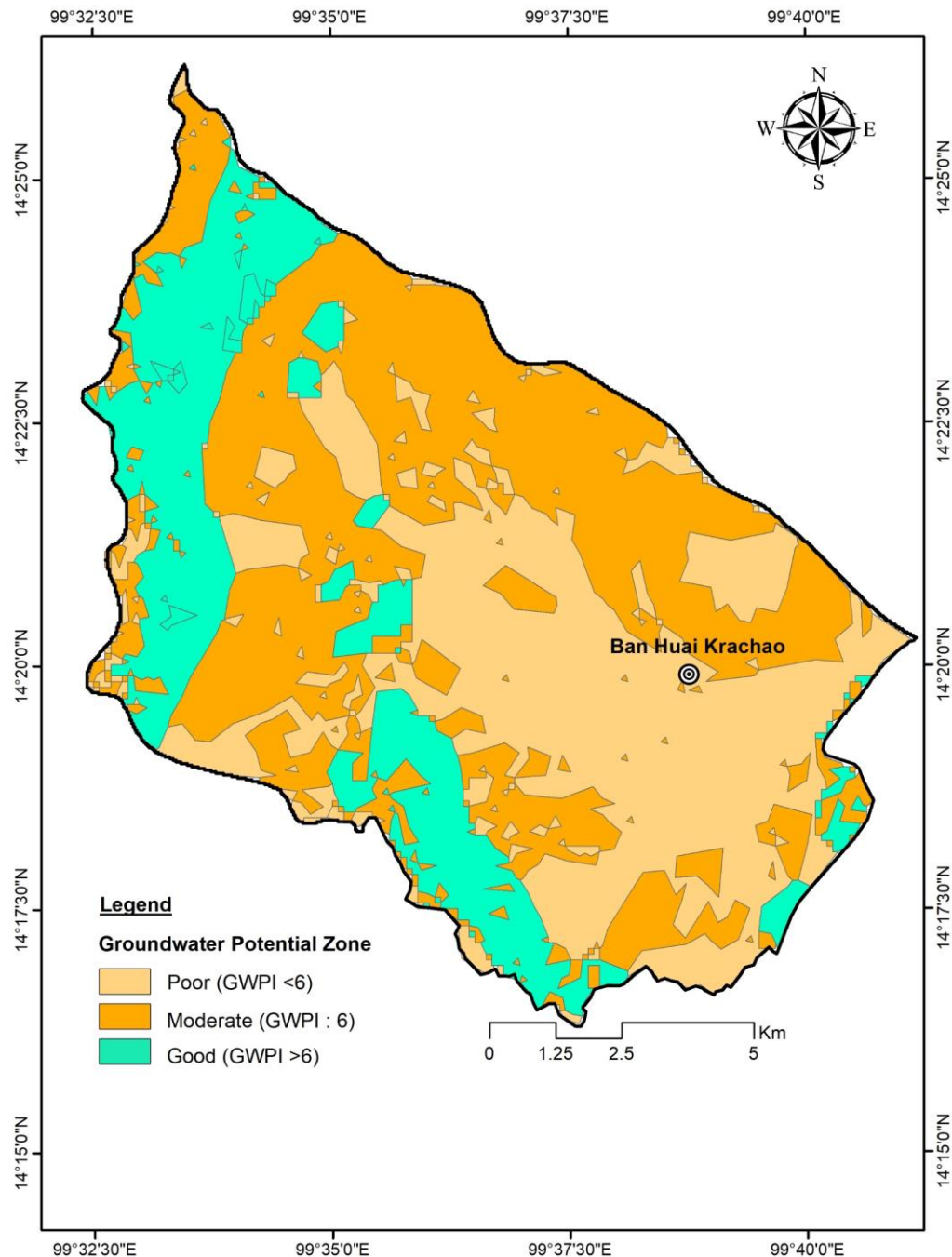
Drainage Density



Rainfall



Groundwater level



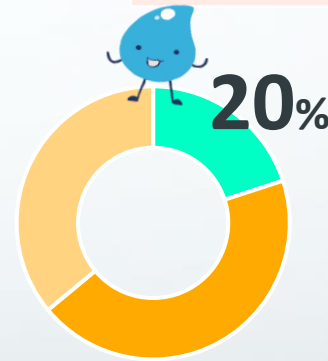
Results

Groundwater potential zones

high potential (GWPI > 6), moderate potential (GWPI = 6) and low potential (GWPI < 6) zones.

Total area of Huai Krachao **150.2 km²**

GWPI<6	Low potential	53.4 km ²	36 %
GWPI:6	Moderate potential	62.5 km ²	44 %
GWPI>6	High potential	31.2 km ²	20 %



Ban Thung Kun
Ban Udomsuk
Ban Tub Praya
Ban Don
Ban Thung Mung Kala
Ban Payom Ngam

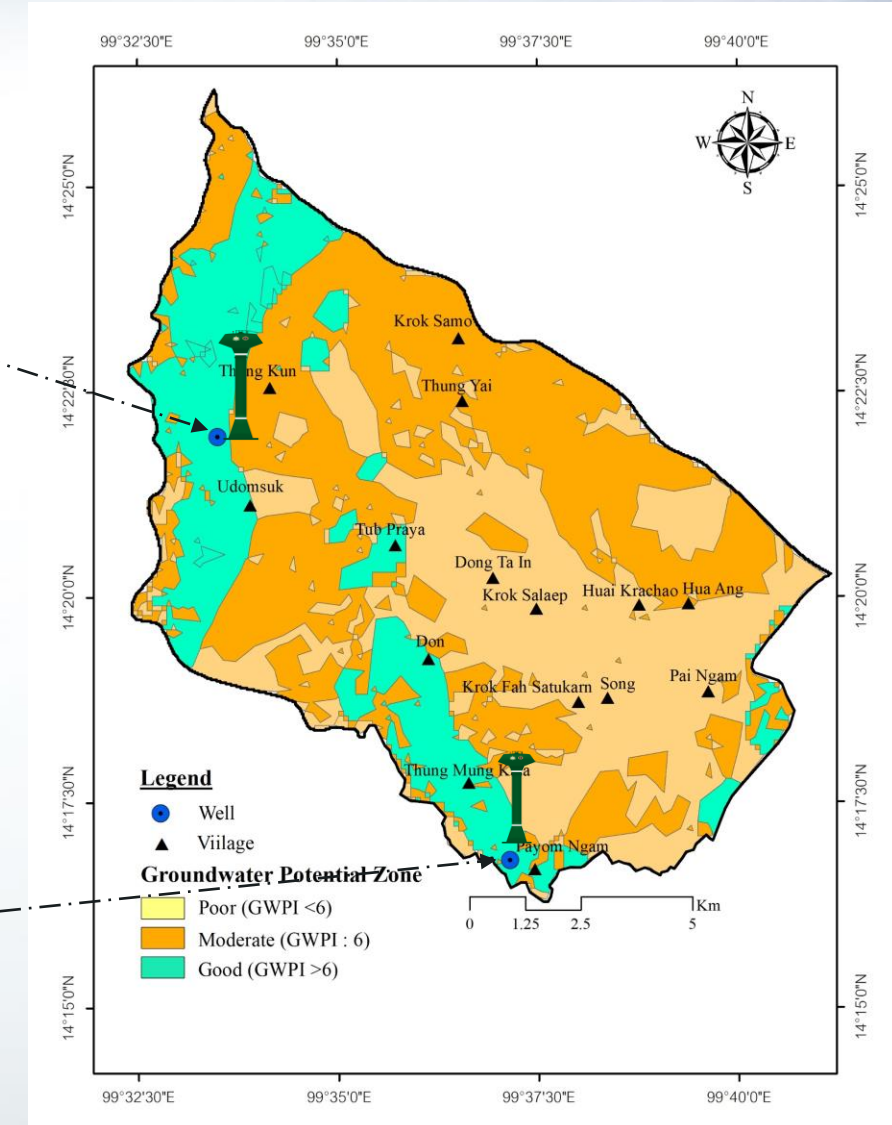
Discussion

Groundwater Potential Zone and Drilling Borehole

- Ban Thung Kun**
Drilling depth 284 -303 m.
Well yields 30-40 m³/hr
Spring 4-6 m.
Support water for 4 villages
1,719 people



- Ban Payom Ngam**
Drilling depth 164-250 m.
Well yields 15-20 m³/hr
No Spring
Support water for 5 villages
1,439 people



Conclusions

GIS Analysis for groundwater exploration in hard rock terrains

GIS analysis has the ability to classify high moderate and low groundwater potential zones in Huai Krachao, where the High potential zones are located on the west, southwest, and southeast area. After that, it should be validated by conducting geology and geophysical surveys prior to selecting the drilling site.

9 Parameters

High potential zone

- Silurian-Devonian metamorphic rocks
- Slopes and hills with an elevation of 82-116 m above MSL.
- High rainfall rate (average 993-1,065 mm/year)
- High lineament density ($>4 \text{ km/km}^2$)
- Gentle slope (<10 degrees)
- Mostly used for agriculture.



Save

Save time and money for the survey in large area

SDG 6: Clean Water and Sanitation

Managing groundwater resources might be one possible solution to prevent water shortages and reduce water stress in this area whenever people have access to clean and safe water.



Thank you

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