



# Impact of Air Quality Factors on Lichen Species Diversity in the Sago Palm Forest of Ban Sai Khan, Khok Saba Sub-district, Na Yong District, Trang Province

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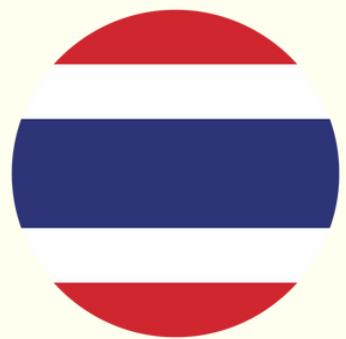
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**The Sago Palm Forest ecosystem, located in Ban Sai Khan, Khok Saba Subdistrict, Na Yong District, Trang Province, represents an area of unique ecological characteristics and holds significant importance for local biodiversity.**

**Consequently, the research team recognizes the importance of investigating the correlation between atmospheric physical factors and the diversity of lichen species within the Sago Palm Forest. This study aims to analyze how local atmospheric properties influence the occurrence and distribution of lichen species.**



## Research Methodology

**Study Site Selection** The study was conducted at the Sago Palm Forest in Ban Sai Khan, Khok Saba Sub-district, Na Yong District, Trang Province. The study site is located at coordinates 7.491238° N, 99.712458° E.

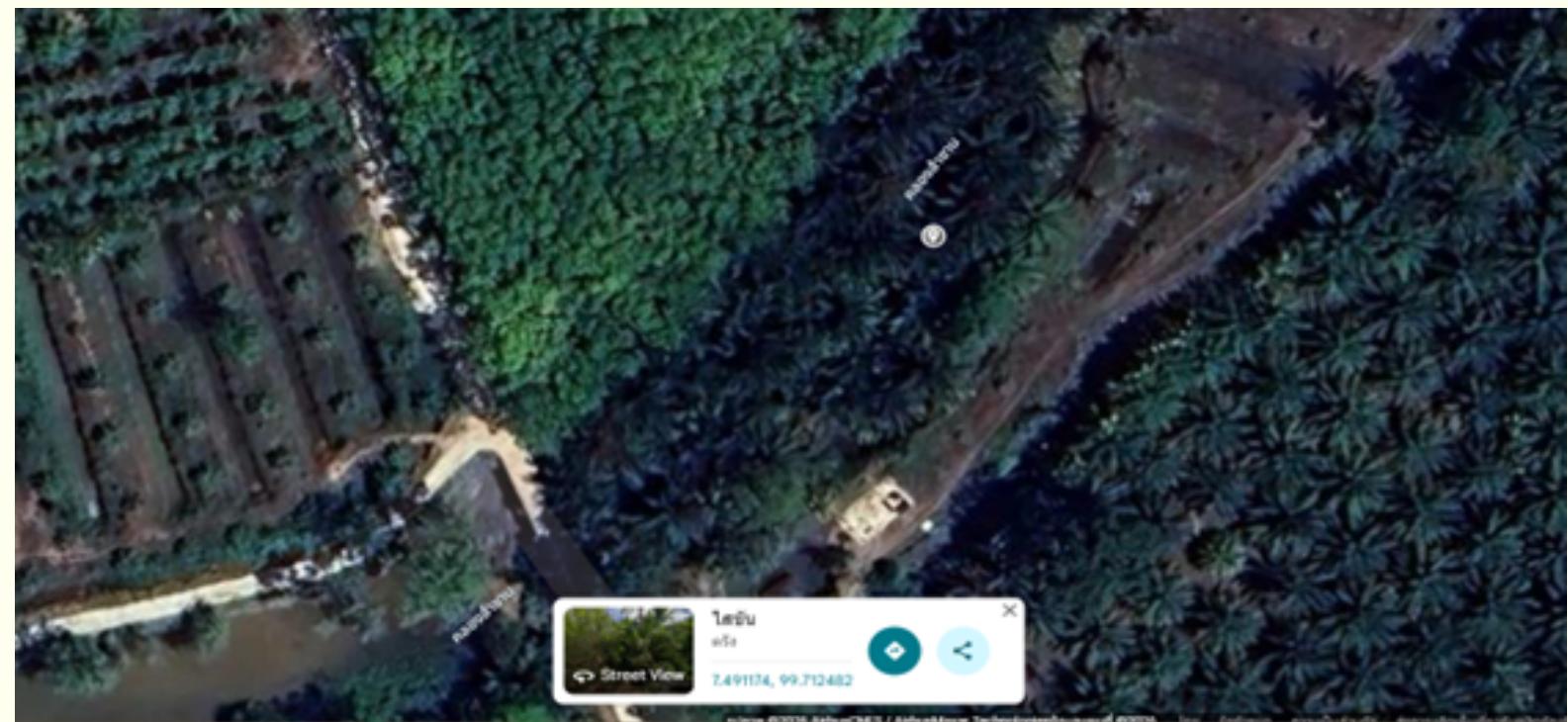
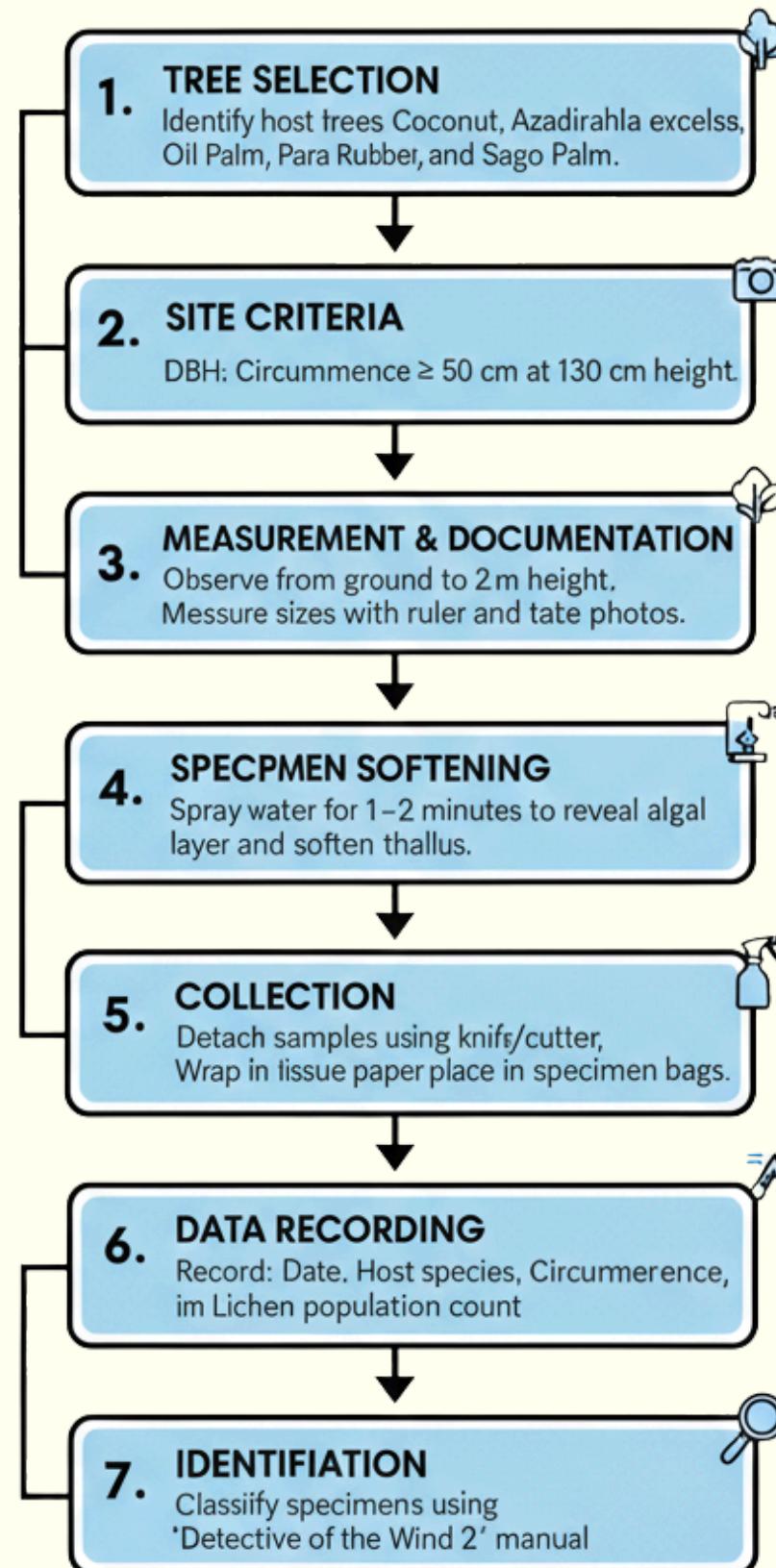


Figure 1: Study site at Ban Sai Khan Sago Palm Forest, Khok Saba, Na Yong, Trang (Source: Google Maps).

# LICHEN SAMPLING & PREPARATION

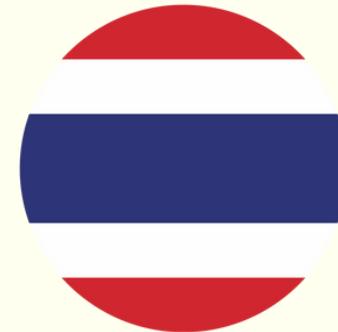


## DETAILED BREAKDOWN OF STEPS

Selection	Description
Target 5 specific host tree species with a minimum circumferenc of 50 cm.	
<b>Preparation</b>	
Focus on specific species from 0 circumference of 50 cm.	
The 1-2 minute vertical zone 0 2 meters. Photography is used for theif used for in-situ documentation.	
<b>Extraction</b>	
Tissue paper water spray to prevent lichen from crumbling during to prevent mold.	
<b>Storage:</b> Tissue paper tipping in bags to prevent mold	

Final identification relies on mastery of the 'Woods 2' taxonomic standard





**Environmental Data Collection The following environmental factors and instruments were utilized:**

**Temperature: Maximum and Minimum Thermometer.**

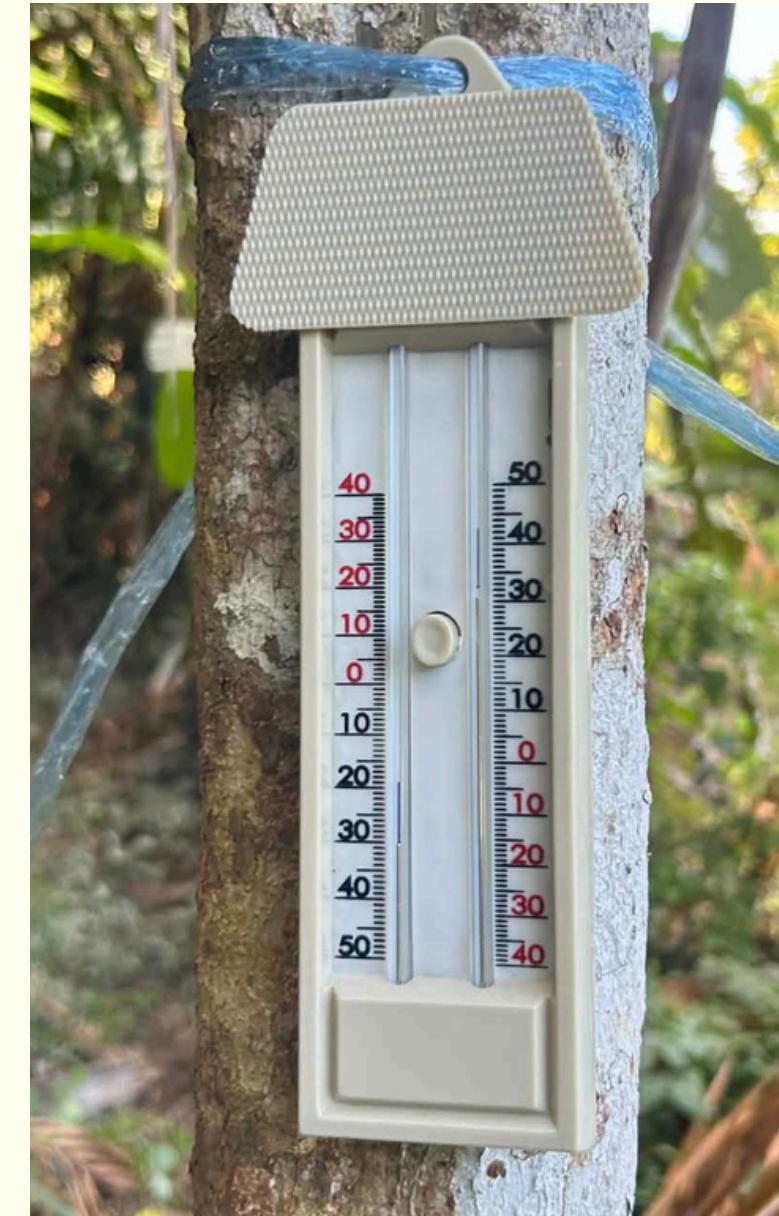
**Humidity: Hygrometer.**

**Direction: Compass.**



# Research Equipment:

- 1. FUJI Hygrometer**
- 2. MAXIMA-MINIMA Thermometer**
- 3. Magnifying glass**
- 4. Rain gauge**
- 5. Ziplock bags**
- 6. Knife / Utility cutter**
- 7. Ruler**
- 8. Tissue paper**
- 9. Measuring tape**
- 10. Cloud chart**
- 11. Spray bottle**



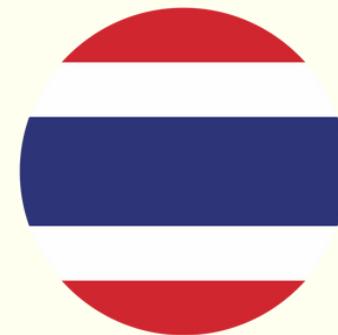
# Results of the Study

**Investigation of Physical Factors and Lichen Diversity on Trees in the Sago Palm Forest, Ban Sai Khan, Khok Saba Subdistrict, Na Yong District, Trang Province.**

**Table 1: Average Maximum-Minimum Temperature and Average Relative Humidity During the Data Collection Period**

Data Collection Period	Measurement Time	Mean	Mean	Wet	Dry	Mean
		Max Temp (°C)	Min Temp (°C)	Bulb Temp (°C)	Bulb Temp (°C)	Relative Humidity (%)
December	Approx. 12:00 PM	36.7	23.6	27.0	29.4	80%
January	Approx. 12:00 PM	40.4	23.4	27.0	29.0	81%





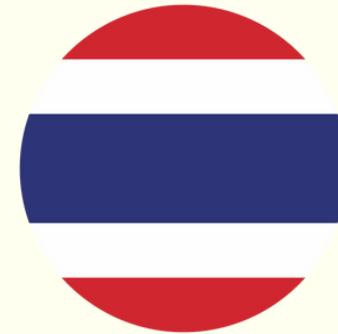
**Table 2: Sky Conditions on Field Study Dates**

Study Date	Cloud Characteristics	Cloud Cover Amount	Interpretation
December 5, 2025	Low-level clouds; Stratocumulus/Cumulonimbus formations.	90%	Overcast; Cloud cover exceeding a ratio of 9/10.
January 13, 2026	Aggregated and scattered clouds; appearing as both lumps and sheets (Altocumulus and Cirrus).	27.5%	Scattered clouds.



**Table 3: Summary of Lichen Species Found in the Sago Palm Forest**

Host Tree Species	Crustose				Squamulose	Foliose	Fruticose
	<i>Tephromela</i>	<i>Graphis</i>	<i>Sarcographa labyrinthica</i>	<i>Diorygma</i>	<i>Phyllopsora furfuracea</i>	-	-
Coconut Palm ( <i>Cocos nucifera L.</i> )	✓	-	-	-	✓	-	-
Sentang / Thiam ( <i>Azadirachta excelsa</i> )	-	-	✓	-	-	-	-
Sago Palm ( <i>Metroxylon sagu Rottb.</i> )	-	-	✓	-	-	-	-
Palm ( <i>Arecaceae</i> )	-	-	✓	-	✓	-	-
Rubber Tree ( <i>Hevea brasiliensis</i> )	✓	✓	-	✓	✓	-	-

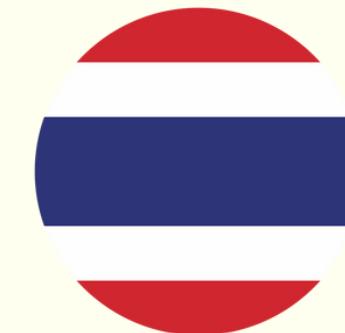


## Lichen Species Descriptions

### 1. *Tephromela* sp.



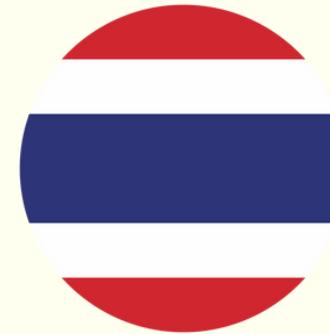
- **Characteristics:** Grey thallus with a rough surface. Dark black apothecia with grey margins.
- **Spores:** Hyaline (clear), ellipsoid, non-septate (simple).
- **Habitat:** Commonly found in the canopy of tropical rainforests.



## 2. **Graphis sp.**



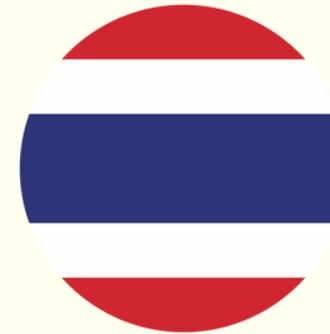
- **Characteristics:** Grey thallus with a smooth surface. Apothecia are narrow and slit-like (lirellae), shiny black in color.
- **Spores:** Hyaline (clear), ellipsoid, multicellular.
- **Habitat:** Dominant in open forests or deciduous forests.



### 3. *Phyllopsora furfuracea*



- **Characteristics: Green thallus composed of small, overlapping scales (squamules). Brown hypothallus.**
- **Habitat: Dominant in tropical rainforests.**

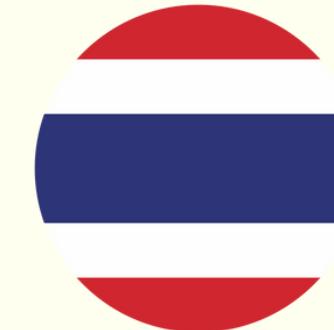


## 4. *Sarcographa labyrinthica*

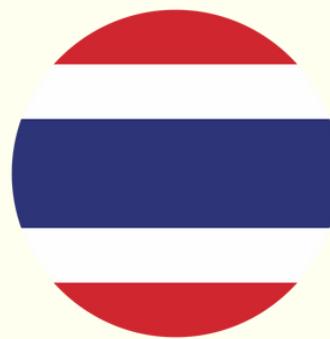


- **Characteristics:** Greenish-brown thallus with a smooth surface. Apothecia are clustered and covered with grey pruina (crystals).
- **Spores:** Brown, ellipsoid, multicellular.
- **Habitat:** Found across various forest conditions.

## 5. **Diorygma sp.**

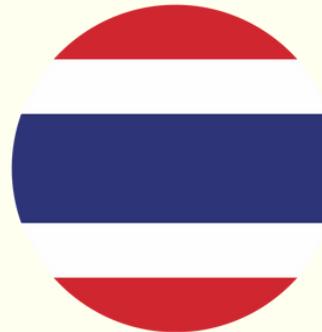


- **Characteristics:** Grey thallus with a smooth surface. Apothecia are widely open, covered with white pruina, branched, and have grey margins.
- **Spores:** Hyaline (clear), ellipsoid, muriform.
- **Habitat:** Dominant in open forests.



## Conclusion

The study investigated the physical environmental factors in the Sago Palm Forest of Ban Sai Khan, Khok Saba Sub-district, Na Yong District, Trang Province. In December 2025, the average maximum temperature was recorded at 36.7°C, the average minimum temperature at 23.6°C, and the average relative humidity at 80%. In January 2026, the average maximum temperature increased to 40.4°C, the average minimum temperature was 23.4°C, and the average relative humidity was 81%.

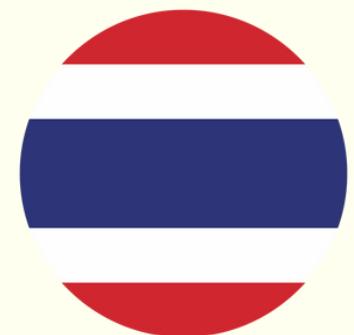


- **Sarcographa labyrinthica:** Characterized by a brownish-green, smooth thallus. The apothecia are clustered and covered with grey crystals. The spores are brown, elliptical, and multi-cellular. This species is distributed across various forest types.
- **Diorygma sp.:** Characterized by a smooth grey thallus and wide, branched apothecia covered with white crystals and grey margins. The spores are hyaline and muriform-elliptical. This genus is prominently found in open forests.



## **The survey of lichen species diversity within the Sago Palm Forest identified several prominent genera and species with the following characteristics:**

- **Tephromela sp.:** Distinguished by a grey, rugose (rough) thallus and dark black apothecia with grey margins. The spores are hyaline (clear), elliptical, and non-septate. This genus is typically found on the canopy of tropical rainforests.
- **Graphis sp.:** Characterized by a smooth grey thallus and narrow, elongated, glossy black apothecia. The spores are hyaline, elliptical, and multi-cellular. This genus is predominantly found in open forests.
- **Phyllopsora furfuracea:** Identified by a green thallus consisting of small, overlapping squamules and a brown hypothallus. This species is commonly found in tropical rainforests.



## References

Aptroot, A., & Lücking, R. (2021). A community-based identification guide to tropical lichens. *Field Studies in Lichenology*.

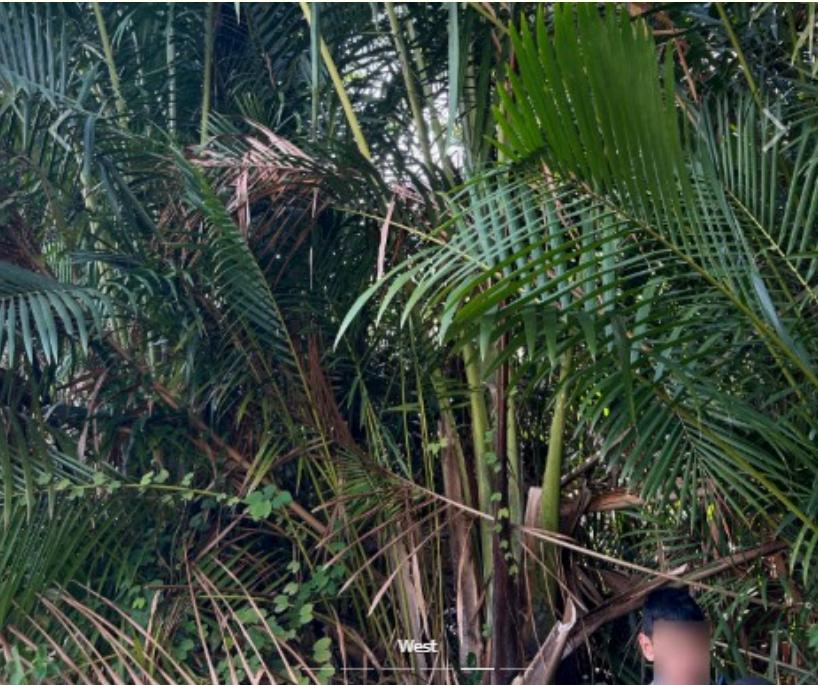
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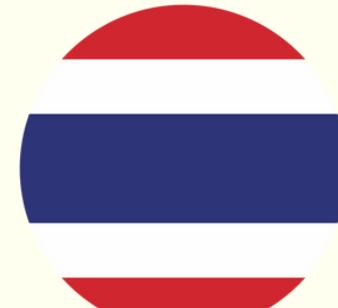
# GLOBE Data Entry



Measured Date:	2026-01-13
Organization Name:	Sawat Rattanapimuk
Site ID:	408078
Site Name:	47NNJ786281
Country Name:	Thailand
Country Code:	THA
Latitude:	7.491077
Longitude:	99.712381
Elevation:	24.6m
Measured At:	2026-01-13T08:33:00
Solar Measured At:	2026-01-13T15:02:00
Cloud Cover:	scattered
Cloud Cover Mid:	isolated
Cloud Cover Low:	isolated
Opacity Mid:	transparent
Opacity Low:	transparent
Sky Visibility:	clear
Sky Color:	blue
Dry Ground:	true

Clouds	
Measured Date:	2025-12-05
Organization Name:	Sawat Rattanapimuk
Site ID:	408799
Site Name:	Sagu Forest Bann Saikhon
Country Name:	Thailand
Country Code:	THA
Latitude:	7.49389
Longitude:	99.71295
Elevation:	27m
Measured At:	2025-12-05T05:15:00
Solar Measured At:	2025-12-05T12:03:00
Cloud Cover:	isolated
Cirrocumulus:	true
Cumulus:	true
Cloud Cover Mid:	isolated
Short Lived Contrails:	1
Spreading Contrails:	0
Non-Spreading Contrails:	0
Sky Visibility:	unusually clear
Sky Color:	light blue
Standing Water:	true
Muddy:	true
Leaves on Trees:	true
Data Source:	GLOBE Observer App
Satellite Match:	Match Not Available

 [Show on Map](#)



Sawatrattanaphimuk School, Na Yong District, Trang Province, Thailand

