**Research Title :** Study on Climate Change in Mueang District, Kalasin Province (2021-2023)

**Author :** Ms. Wiranrat Rattanatrantong Ms. Nisa Kongkhungnawat Ms. Suwaphat Sribanchuen

**Advisors :** Mr. Chumpon Chareesaen

## Abstract

Between 2021 and 2023, the Northeastern region of Thailand experienced significant climate changes. Summer temperatures rose to 40°C, while winters became warmer and shorter. Relative humidity decreased, leading to dry conditions and making the rainy season unpredictable, resulting in both floods and droughts. These changes have had a significant impact, especially in Mueang District, Kalasin Province. Monitoring weather conditions, adjusting management practices, and enhancing community adaptation are crucial for future sustainability.

## Introduction

The Northeastern region of Thailand has a tropical monsoon climate, consisting of three seasons: summer, the rainy season, and winter. However, between 2021 and 2023, the region's climate has shown significant changes, particularly in terms of temperature and relative humidity.

Data indicates that overall temperatures in the region have risen, with some areas reaching up to 40°C in summer. Meanwhile, winters have become warmer, with a shorter duration of cold weather. Relative humidity has also shown a decreasing trend, especially during summer and winter, leading to drier conditions. The rainy season has become more unpredictable, with inconsistent rainfall distribution, causing flooding in some areas while others experience water shortages.

Kalasin Province is among the areas affected by these climatic changes. Rising temperatures and declining relative humidity have intensified extreme weather conditions, resulting in prolonged heat accumulation and extended dry periods. Additionally, fluctuations in rainfall have created uncertainty in water resource management.

Therefore, continuous monitoring of weather data, analyzing trends in temperature and relative humidity, and implementing effective water resource management are crucial. These efforts are essential in preparing for climate change and promoting sustainability in Kalasin Province and the Northeastern region of Thailand.

## Objective

To study the impacts of climate change in northeastern Thailand, particularly in Kalasin Province, focusing on temperature and relative humidity.

## Research question

How important is continuous weather monitoring for planning responses to climate change?

## Hypothesis

The increase in temperature and decrease in relative humidity have led to drier conditions in Mueang District, Kalasin Province, during the summer and winter seasons from 2021 to 2023.

## Methodology

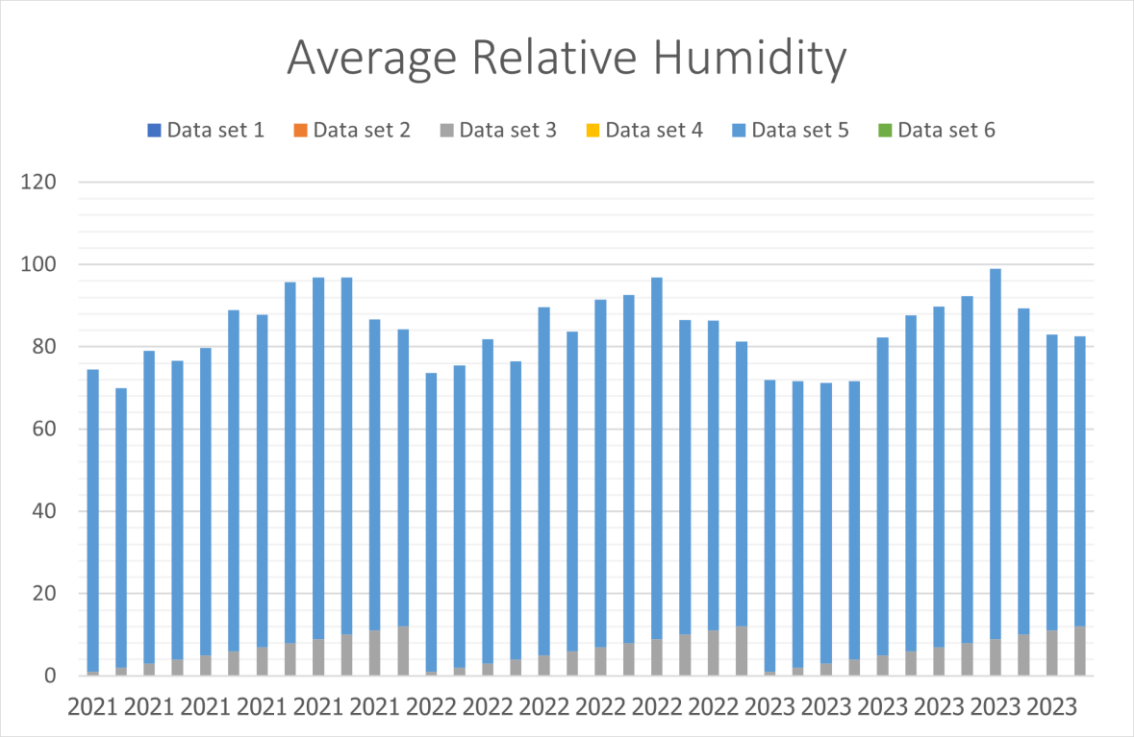
This study will focus on collecting data on temperature and relative humidity in Kalasin Province between the years 2021 and 2023, using digital instruments to measure temperature and relative humidity, namely the Digital Thermometer and Digital Hygrometer. The data will be collected on a monthly basis to calculate the average temperature and relative humidity for each year.

## Experimental method

The temperature data was extracted from the Annual Statistical Report 2024 of the National Statistical Office of Thailand, published on the official website (National Statistical Office of Thailand, 2024). The data is from page 206 of the PDF document. Additionally, the National Statistical Office of Thailand, "Monthly Temperature and Atmospheric Pressure Data: 2022-2023," ( available at: https://www.nso.go.th. )

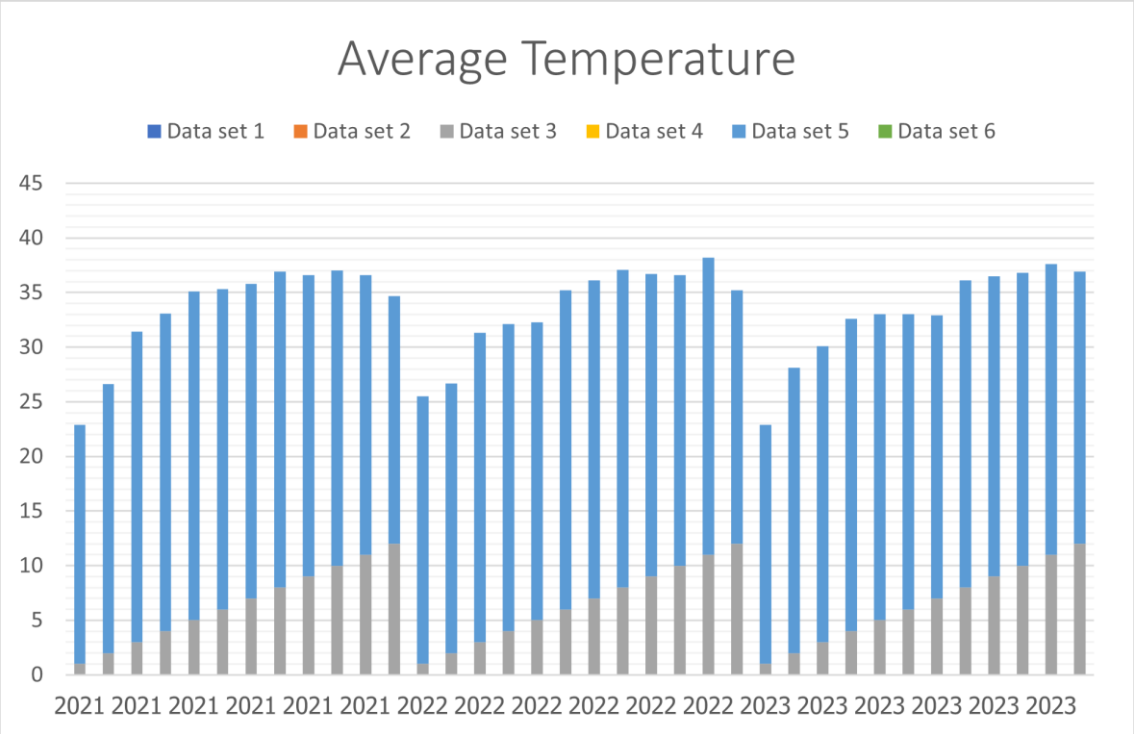
**Results**

A study on climate change in Mueang District, Kalasin Province, between 2021 and 2023 was conducted to collect data on relative humidity and temperature for each year.




This graph presents data on the average relative humidity in Kalasin province between 2021 and 2023, highlighting the fluctuations in humidity levels during this period. The relative humidity reached nearly 100% during certain periods, which is typical in the rainy season due to increased rainfall and the evaporation of water from water sources and soil. In contrast, during some periods, the humidity dropped below the average, likely occurring during the hot or dry seasons, when high temperatures and increased evaporation rates prevail.

Particularly in 2023, there was a noticeable decline in relative humidity during certain periods compared to the previous years, which may reflect local climate change impacts affecting the humidity cycle in Kalasin province. The data in the graph consists of several datasets, with Data set 1 (blue) being the primary dataset used to represent the average relative humidity.




This graph presents data on the average temperature in Kalasin Province from 2021 to 2023, illustrating fluctuations in temperature over the period. In some instances, temperatures rose to nearly 40°C, likely occurring during the summer season, while in other periods, temperatures dropped below 20°C, possibly indicating the winter season.

In 2023, the average temperature showed an increasing trend in certain periods compared to previous years. This may reflect the impact of global warming and local climate change, which influence temperature patterns in Kalasin Province. The graph includes multiple datasets, with Data set 1 (blue) serving as the primary dataset used to illustrate the changes in average temperature over the specified period.

## Summary and Discussion

The study found that changes in temperature and relative humidity in northeastern Thailand, particularly in Kalasin Province, have significantly impacted the climate and water resources. Increasing heat accumulation and decreasing relative humidity have led to drier and more extreme weather conditions during summer and winter. Meanwhile, the uncertainty in rainfall patterns has created challenges in water resource management.

Therefore, continuous monitoring of weather data, along with studying the factors influencing changes in temperature and relative humidity, is essential. This will enable effective planning and adaptation to the evolving climate conditions. Developing sustainable water management strategies and optimizing resource utilization will be key to ensuring the long-term resilience of Kalasin Province and the surrounding region.

**Discuss the results of the experiment**

Between 2021 and 2023, the climate in Northeastern Thailand has undergone significant changes. Temperatures have increased, with some areas reaching up to 40°C in summer, while winters have become warmer with shorter cold periods. Relative humidity has decreased, especially in summer and winter, leading to drier conditions. The rainy season has become more unpredictable, with inconsistent rainfall causing both flooding and water shortages.

Kalasin Province has been particularly affected, experiencing rising temperatures, declining humidity, and extreme weather conditions. These changes have led to prolonged heat accumulation, extended dry periods, and challenges in water resource management. Continuous monitoring and effective adaptation strategies are necessary to mitigate the impacts of climate change in the region.

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