

# IMPACT OF RESIDUE OPEN BURNING ON AIR QUALITY IN BANGKOK USING SENTINEL 2 DATA

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**Keywords:** PM2.5; open burning; NBR+ (Normalized Burn Ratio+); wind

## 1. INTRODUCTION

Rice and sugarcane agriculture have been central to the economy, culture, and politics of Thailand, however, there are downsides as they also contribute to waste and pollution due to open burning practices. This study focuses on determining the impact of wind parameters and field burning area on the PM2.5 mass concentration recorded in the vicinity of the capital city of Thailand. The results are expected to be used for deploying the air quality, understanding the source of pollution and geospatial distribution of PM2.5 mass concentration in Bangkok, Thailand.

## 2. METHODOLOGY

The PM2.5 (average daily) was collected from Thailand Pollution Control Department from 70 ground stations with 12 sites in Bangkok. The study period spanned from 1<sup>st</sup> Jan 2019 to 31<sup>st</sup> Dec 2021. In case of wind characteristics and the Normalized Burn Ratio (NBR+) index, the MERRA – 2, NASA and Sentinel 2 satellite data was used [1].

The data were processed and statistical analysis was conducted to understand the distribution and detect the correlation between the trend in fluctuation of PM2.5 density intensity corresponding to the NBR+ index as well as the wind characteristics, including wind speed and wind direction [2].

## 3. RESULT AND DISCUSSION

The PM2.5 distribution analysis revealed that the average values ranged from 12.32  $\mu\text{g}/\text{m}^3$  to 52.11  $\mu\text{g}/\text{m}^3$  from Jan 2019 and to Dec 2021, with peak in the months from Dec to Feb every year.

Seasonal wind distribution analysis revealed a major part of the wind viz, Jan-Mar (83.7%), Apr-Jun

(70.0%), and Jul-Sep (86.7%) wind was accounted from North to East direction only.

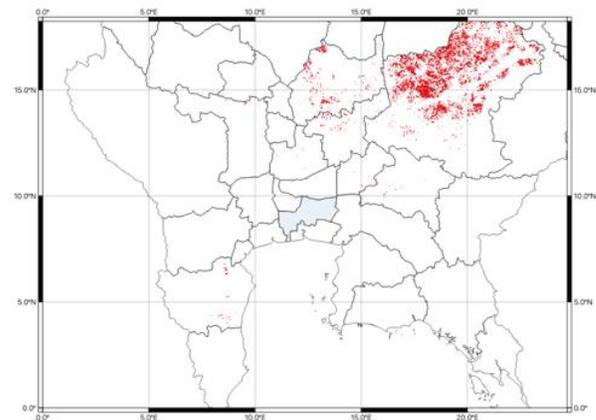


Figure 1. The burned area map using NBR+ in Bangkok in April 2020.

The correlation analysis revealed that the major unhealthy aerosol coming from the Northeast wind with 49.41% of over moderate level of PM2.5 in the same period of the burning activity.

## 4. CONCLUSION

PM2.5 mass concentration in area of Bangkok is effected by the burning activity in different regions in Thailand, especially from the Eastern and Northeastern with the high correlation coefficient value of 0.779 and 0.812. The impact is clearly observed from Nov to Feb, with Jan as the most polluted, similar to the harvest time of rice and sugarcane industry. Northern wind is considered as a major site effect transfer the large amount of air pollutants.

## 5. REFERENCES

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