

THE REPORT ON THE STATUS OF PM_{2.5} AND ITS IMPACT ON PUBLIC HEALTH IN VIETNAM 2021

Project “Improving air pollution monitoring and management of Vietnam with satellite PM_{2.5} observation”



Context

- Air pollution is one of the major environmental challenges facing nations worldwide. Various foreign and domestic air quality reports have point out the **high levels** of air pollution, especially PM_{2.5}, in Vietnam.
- The health impact assessment of a certain environmental factor can help legislators to gain proof on the levels of overall impacts of that factor and work on suitable management plans.

Context

- Goals: Provide insight into the status of PM_{2.5} across Vietnam in 2021 and assess the health benefits if PM_{2.5} pollution was controlled
- Target audience: General public | Government agencies | Media, press
- Content of the report: The status of PM_{2.5} and its impact on public health in 2021
- Implementing units: The Geo-Informatics research team from the Vietnam National University Hanoi – University of Engineering and Technology, the University of Public Health, the Live&Learn for the Environment and Community center
- Supporting units: The research team from the Northern Center for Environmental Monitoring, Vietnam Environment Administration, the Institute for Environment and Resources, Vietnam National University Ho Chi Minh city

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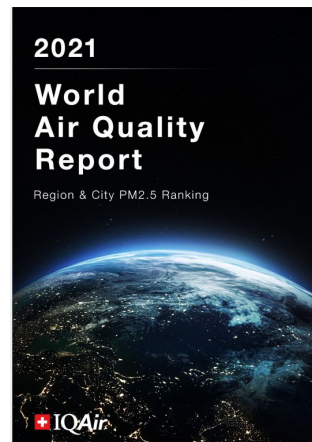
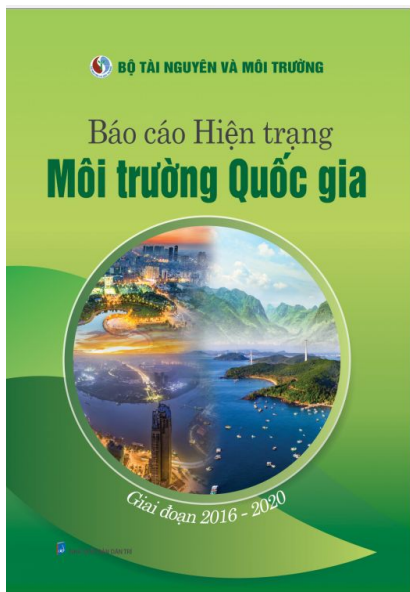
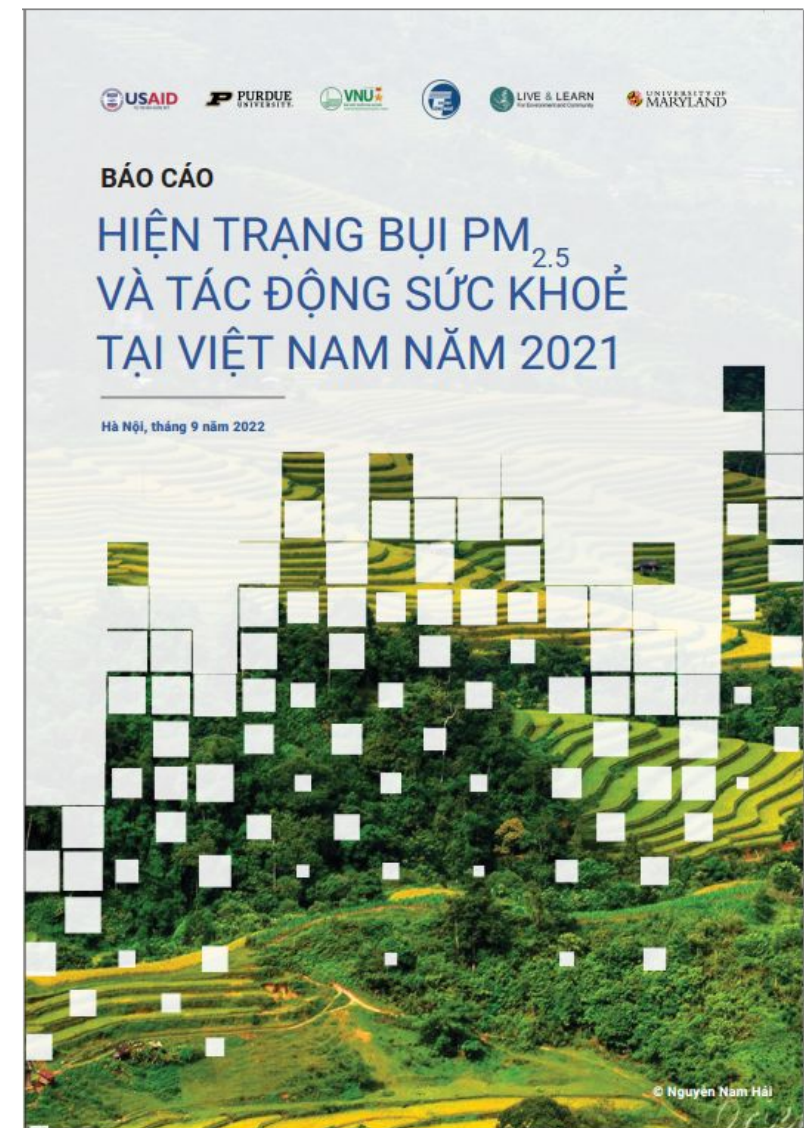
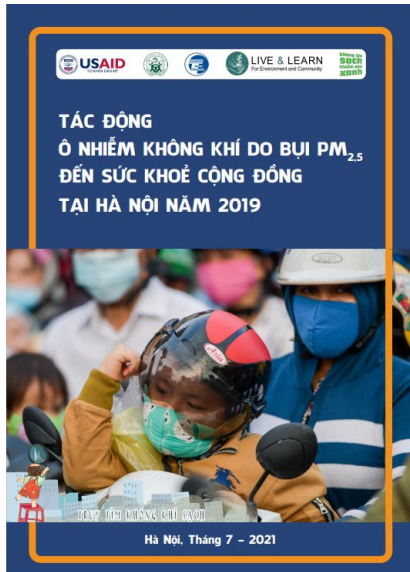
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Hanoi Environmental Protection Agency, Hanoi Environment and Natural Resources

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Health Environment Management Agency, Ministry of Health

Hanoi Centers for Disease Control and Prevention(Hanoi CDC)



What's new

- This is the first report that combines the analysis of the PM_{2.5} pollution and assessment of PM_{2.5}'s impact on public health for 63 provinces across Vietnam, with detailed analysis at district level for several provinces/cities.
- The PM_{2.5} data used for analysis is the daily PM_{2.5} concentration dataset with a spatial resolution of 3x3km that covers the Vietnam region, which was produced from the data of multiple standardized air quality monitoring stations and other supplementary data, updated to the year 2021.
- This report contains analysis results on the status of PM_{2.5} nationwide, region-wise, and in 5 provinces/cities in 2021
- Health impact assessment on a national scale. This is the avoidable deaths if Vietnam had implemented different measures to cut down emission sources of PM_{2.5} like the measures taken in 2020.

- Details on the Status of PM_{2.5} in 2021
- Details on the Health impact assessment in 2021

CONCLUSION

The Status of PM_{2.5} in Vietnam in 2021

On a national scale

- The annual mean of PM_{2.5} concentration in 2021 showed a decrease compared to 2019 and a slight increase compared to 2020 due to unusually high values in January 2021. Areas with high PM_{2.5} concentration are mainly in the Red River Delta region (Hanoi and neighboring provinces).
- In 2021, there were 06/63 provinces and cities with annual mean PM_{2.5} exceeding Vietnam standards (QCVN 05:2013/BTNMT), including Hanoi, Bac Ninh, Hung Yen, Vinh Phuc, Ha Nam and Hai Duong. PM_{2.5} exposure was higher than the average value of PM_{2.5} in all provinces/cities. Compared to the WHO recommendations in 2021 (5 µg/m³), the PM_{2.5} concentration in all provinces and cities nationwide in 2021 were many times higher, which poses great threats to the overall public health.

On a regional scale

- 76% of provinces in the Northern region had annual average PM_{2.5} concentrations that met the Vietnam standards. Average PM_{2.5} concentration values per district in this region ranged from 13.1 µg/m³ to 43 µg/m³.
- 100% of provinces in the Central region had annual average PM_{2.5} concentrations that met the Vietnam standards (25 µg/m³). Average PM_{2.5} concentration values per district in this region ranged from 11.0 µg/m³ to 23.1 µg/m³.
- 100% of provinces in the South had annual average PM_{2.5} concentrations that met the Vietnam standards (25 µg/m³). Average PM_{2.5} concentration values per district in this region ranged from 11.4 µg/m³ to 21.3 µg/m³.

The Status of PM_{2.5} in Vietnam in 2021

In selected provinces/cities

- In **Hanoi** and **Bac Ninh**, annual mean PM_{2.5} concentrations at all the districts exceeded the Vietnam standards and WHO recommendations in 2021.
- In **Thai Binh**, annual mean PM_{2.5} concentrations at 5/8 districts (62.5%) exceeded the Vietnam standards and WHO recommendations in 2021.
- In **Nghe An** and **Ho Chi Minh city**, annual mean PM_{2.5} concentrations at all districts were lower than the Vietnam standards but higher than WHO's recommendations in 2021.

In different urban areas

- The ratio of urban areas with annual mean PM_{2.5} in 2021 exceeding the Vietnam standards tended to decrease according to the level of urban levels, the highest in special urbans, the lowest in type III urbans

Trong thời kỳ giãn cách xã hội do COVID-19

- During social distancing following Directive 16/CT-TTg (from 24/07 to 21/09), PM_{2.5} levels dropped 22,8% compared to normal conditions (not affected by social distancing) in **Hanoi**. This number was 41,4% in **Ho Chi Minh city**.

Health impact assessment

- Our results showed that in Vietnam, the number of premature deaths in 2019 due to higher PM_{2.5} exposure than the WHO recommended level was approximately 56,808 cases nationwide, accounting for about 9.9% of the total number of deaths due to natural causes in Vietnam.
- Between different socio-economic regions, the number of deaths attributable to excessive PM_{2.5} exposure in 2019 was higher in the Red River Delta, North Central Coast and South-Central Coast. The Central Highlands region had the lowest number of PM_{2.5} attributable deaths.
- Hanoi and Ho Chi Minh City had the highest number of deaths due to excessive PM_{2.5} exposure in the country in 2019.
- If Vietnam had applied emission control measures, the total number of deaths due to exceedance of PM_{2.5} exposure would have reduced by 6.7% of the total number of deaths due to PM_{2.5} in 2019 nationwide.

RECOMMENDATIONS

For state units and organizations (Ministry of Natural Resources and Environment, Ministry of Health)

- Use the PM_{2.5} concentration maps in air quality monitoring for a general picture of the current status of the air environment at the national, regional, provincial and city levels each year.
- Prioritize air quality monitoring and management in the order of PM_{2.5} status of provinces and cities
- Invest in air quality management by region and level of urbanization
- Improve the national standard air quality monitoring network, giving priority to provinces and regions with air pollution as recommended earlier in this report.
- Periodically review and improve the national technical regulations on air quality and emission sources
- Perform health impact assessment annually
- Improve the systems for deaths and illnesses statistics in health facilities
- Engage in interdisciplinary collaboration to improve the health of the community due to air pollution.

For research institutes, universities

- Invest in statistical modeling and machine learning studies for air pollution
- Promote in-depth research on the health impact of air pollution
- Promote research to identify the source contributors of PM_{2.5} and other air pollutants
- Consult with government agencies on the process and results of the health impact assessment

THANK YOU FOR LISTENING!
