LASER PULSE

Long-term Assistance and SErvices for Research (LASER)

Partners for University-Led Solutions Engine (PULSE)

WORKSHOP

"STATE OF PM2.5 IN VIETNAM DURING 2019-2020 BASED ON MULTISOURCE DATA AND APPLICATION OF SATELLITE TECHNOLOGY IN AIR POLLUTION MONITORING AND RESEARCH"

WORKSHOP SUMMARY

SUPPLEMENT TO AGREEMENT NO. AID-7200AA18CA00009

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LASER PULSE Delivering Practical, Research-Driven Solutions to Global Development Challenges

ABOUT LASER PULSE

LASER (Long-term Assistance and SErvices for Research) PULSE (Partners for University-Led Solutions Engine) is a five-year, $70M program funded through USAID's Innovation, Technology, and Research Hub, that delivers research-driven solutions to field-sourced development challenges in USAID partner countries.

A consortium led by Purdue University, with core partners Catholic Relief Services, Indiana University, Makerere University, and the University of Notre Dame, implements the LASER PULSE program through a growing network of 2,700+ researchers and development practitioners in 61 countries.

LASER PULSE collaborates with USAID missions, bureaus, and independent offices, and other local stakeholders to identify research needs for critical development challenges, and funds and strengthens the capacity of researcher-practitioner teams to co-design solutions that translate into policy and practice.

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"STATE OF PM2.5 IN VIETNAM DURING 2019-2020 BASED ON MULTISOURCE DATA AND APPLICATION OF SATELLITE TECHNOLOGY IN AIR POLLUTION MONITORING AND RESEARCH"

Time of occurrence: 9h30, December 1st, 2021

ORGANIZERS:

- Live&Learn
- VNU UET
- Vietnam Clean Air Partnership
- Tia Sang magazine

PRESENTATIONS:

1. State of $PM_{2.5}$ in Vietnam in 2019 - 2020 based on multi-sourced data - Assoc. Prof. Nguyen Thi Nhat Thanh (VNU UET)
   Highlighted points:

- On a national scale:
  - Annual mean $PM_{2.5}$ value of 2020 showed a decrease compared to 2019.
  - Areas with high $PM_{2.5}$ concentration are located in the Red River Delta (including Hanoi and adjacent provinces), the North Central region (namely Thanh Hoa, Nghe An, Ha Tinh) and the South East region (Ho Chi Minh city, Dong Nai and Binh Duong).
  - In 2020, there were 10/63 provinces with annual mean $PM_{2.5}$ values exceeding the national limit
- In Hanoi, annual $PM_{2.5}$ values of 2020 were higher in the city center and lower in the outskirts. $PM_{2.5}$ concentration showed clear seasonal fluctuations, in which the months from November to next year's March recorded higher levels of $PM_{2.5}$ and the months from May to September had lower values.
- In Ho Chi Minh, annual $PM_{2.5}$ values of 2020 were high in specific districts. $PM_{2.5}$ concentration also follows a seasonal pattern, with the months from November to next year's February (the typical dry season) having higher values than from June to October 10 (rain season).
- $PM_{2.5}$ emission sources:
  - On a national scale, in 2018, prominent sources included 40% from agricultural by-product burning, 17% from conventional cooking, 13% from transportation, 12,7% forest fires, 11% from industrial activities, 3,3% thermal power and 3% of the total PM2.5 emitted were from other sources (not yet accounted for road dust, secondary PM2.5 and other sources

including construction, trash burning, international sea transportation, fire, incense, candle and votive burning, etc.).

- In Hanoi, in 2018, popular emission sources were 48,3% from industrial and craft villages, 21,3% from traffic, 20,2% from agricultural by-product burning (straw), 6,6% from conventional and commercial cooking, and 3,6% of the total PM2.5 emitted came from other sources (not yet accounted for road dust, secondary PM2.5 and other sources including construction, trash burning, international sea transportation, fire, incense, candle and votive burning, etc.).
- In Ho Chi Minh City, in 2017, inventory results showed road sources contributed 45% of the $PM_{2.5}$ emitted, while point sources contributed 32%, and electricity 23%. According to the 2018 inventory results, the main factors of $PM_{2.5}$ emission were traffic, industrial activities, conventional and commercial cooking (with percentages of 58,2%, 22,8%, 12,8%, respectively).

2. Recommendations for air quality research and policies in Vietnam - Ms. Nguyen Phuong Nhung (Live&Learn)
   Highlighted points:

- Utilize multi-source data, including modeling data from satellite images, for air quality monitoring to give a clearer picture of the state of air quality at the national, regional, and provincial levels.
- Develop distribution maps of $PM_{2.5}$ concentrations at district level in polluted provinces and cities.
- Enhance emission inventories for $PM_{2.5}$ and other pollutants.
- Expand the network of air quality monitoring stations run by the Vietnam Government nation-wide, with priority given to the provinces and cites experiencing air pollution.
- Promote the application of advanced technologies in monitoring $PM_{2.5}$ and other pollutants.

3. Application of Satellite Data in Monitoring & Forecasting Air Quality : Mekong Air Quality Explorer - Prof. Falguni Patadia (Mekong Servir)
   Highlighted points:

- Air pollution is considered important to monitor and control because of its effects on human health and the environment.
- A sleuth of actions can be performed in order to control and prevent the effects on the environment, in which the SERVIR system focuses on monitoring and forecasting air pollution.
- SERVIR has many hubs around the globe with focus countries and additional reaches. One of its priorities is to monitor $PM_{2.5}$.
- SERVIR provides a plethora of tools for the public and scientists to collect and use its data.
- Other tools may include: active fire tracking, air quality app, etc.

4. Introduction to the LASER PULSE project - Assoc. Prof. Nguyen Thi Nhat Thanh (VNU UET)
   Highlighted points:

- Intro on the LASER PULSE Program
- Project goals:
  - Develop $PM_{2.5}$ distribution maps on nationwide scale
  - Develop different products the deliver information on $PM_{2.5}$ pollution in different forms

  - Disseminate research and translation products to users
- Implementing units:
  - University of Engineering and Technology, Vietnam National University Hanoi
  - Department of Geographic Science, University of Maryland, U.S.A
  - Live and Learn for Environment and Community
  - Along with other collaborating units
- Expected products of the project, each with general information following:
  - A dataset of daily $PM_{2.5}$ distribution maps from 2019 to 2021;
  - A WebGIS to provide NRT observation of $PM_{2.5}$ over the Vietnam region;
  - Annual report on the state of $PM_{2.5}$ pollution in Việ tNam for 2021;
  - Educational videos on the state of $PM_{2.5}$ pollution;
- Introducing attendees to the surveys for user requirements of the system.