AI on Hi-ASAP
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A proposed idea for a review paper written by Hi-ASAP team

Authors: better to be limited to one or two group leaders from each group, better to be limited to participants who attended May 2019 discussion meeting or following AIs

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Title: Application of Low-cost Sensors in $PM_{2.5}$ Research in Southeast Asian Countries

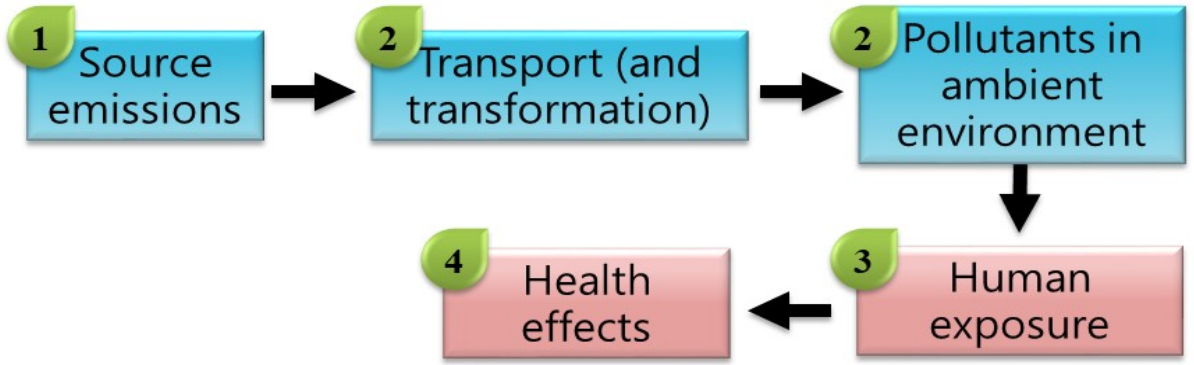
- Journal :
  - International journal of environmental research and public health
  - special issue: “Low-Cost Sensor Applications for Environmental Research: Potentialities and Limitations in Indoor and Outdoor Air Pollution Monitoring”
    - due by the end of December 2021
    - Review paper is at least 4000 words.
    - Draft need to be done by the end of November 2021 and leave sometimes for English editing and revisions
- Purpose: to introduce Hi-ASAP research framework so that joint papers can refer to this paper

1. Introduction

- Advantages of low-cost sensors
- Importance of PM2.5 and health threats
- The unique angles to conduct this research in MANGO region with an international effort
- The focus of this review:
  - (1) review current publication in PM2.5 from low-cost sensors in the southeast Asia
  - (2) identify research priorities in PM2.5 using low-cost sensors in the southeast Asia

2. Materials and Methods

- Description of May 2019 workshop
- Description of follow-up activities with focuses on reviewing current publications and identifying potential gaps
- Put map of the participating research groups as Figure 1.
- Put review framework based on the progression of sources to health impacts as Figure 2.



3. Results (please volunteer to provide inputs)

- 3.1 Publications on source evaluation (sensors or sensors combined with chemical analysis) in this region using low-cost sensors
  - 3.1.1. biomass burning (Talib, Puji)
  - 3.1.2. transportation (Obie)
  - 3.1.3. cooking or street-cooking (Kim, Kraichat)
  - 3.1.4. incense burning (Hien)
  - 3.1.5. waste-burning (Ohnmar)
- 3.2 Publications on ambient monitoring and transport using low-cost sensors in this region
  - 3.2.1. ambient levels in Bangladesh, Indonesia, Malaysia, Myanmar, the Philippines, Taiwan, Thailand, and Vietnam (group leaders)
  - 3.2.2. ambient levels combined with chemical analysis in Bangladesh, Indonesia, Malaysia, Myanmar, the Philippines, Taiwan, Thailand, and Vietnam (group leaders)
  - 3.2.3. transport of biomass burning (Talib, Puji)

3. Results (continued)

- 3.3. Publications on exposure assessment in this region using low-cost sensors
  - 3.3.1. 24-hour exposure (Salam)
  - 3.3.2. activities associated with peak exposures (Candice)
- 3.4. Publications on exposure-health evaluation in this region using low-cost sensors (Mazrura, Dwi, Dang)
  - 3.4.1. Panel-type epidemiological studies (Mazrura, Dwi, Dang)
  - 3.4.2. other types of epidemiological studies (Mazrura, Dwi, Dang)

3. Results (continued)

- 3.5. Research Gaps identified can be filled by using low-cost sensors in this region
  - 1. What are the peak PM2.5 exposure levels and patterns of Asian population, especially those high-exposure or susceptible populations?
  - 2. What are the sources and activities causing peak PM2.5 exposures and the controllable factors associated with those sources and activities? Especially certain unique sources in this region including biomass burning, traffic emission from a variety of different local-made vehicles, waste-burning, street-cooking and (what else ?) need to be assessed.
  - 3. What are the PM2.5 damage coefficients of exposure-health relationship of peak exposures for lung and heart conditions? Are the damage coefficients for the same health outcome different in different PM2.5 concentration ranges? The huge differences in PM2.5 levels in the MANGO region provide a testbed to evaluate this question

3. Results (continued)

- 3.5. Research Gaps identified can be filled by using low-cost sensors in this region
  - 4. What are the chemical and toxicological properties of high-exposure sources, especially distinctive Asian sources? Low-cost sensors can be used to identify hot spots affected by these distinctive Asian sources which can be subsequently evaluated chemically and toxicologically.
  - 5. Should there be a ceiling value or short-term standard for PM2.5 (ex. seasonal, 8-hour or hourly)? What other considerations needed to be included to promote the establishment of such a standard?

4. Discussion

- Common methodology for international comparison
- stakeholder engagement
- path forward

Suggestion or Comments

- Any suggestions or comments for the content of this review paper?
- Are you willing to participate in writing this joint paper?
- Can you provide literature review in one month?
  - The first deadline is October 29, 2021 for Sessions 3.2.1 & 3.2.2 & Table 1
  - The second deadline is November 15, 2021
- Please put reference list right after your paragraphs and use the format as the examples
- Abstract, introduction, materials and methods, discussion and conclusion will be drafted by Candice and circulated among authors for revision

Proposed timelines

- October 29, 2021
  - Literature review for ambient PM2.5 levels (+ chemical analysis) for Sessions 3.2.1 & 3.2.2 & Table 1 in 8 countries from all group leaders; please provide paragraphs, references, and Table 1
  - Introduction, materials and methods from Candice
- November 15, 2021
  - Literature review for source evaluation, transport, exposure assessment, and exposure-health evaluation (all results sessions), please provide paragraphs and references
- November 30, 2021
  - Abstract, introduction, materials and methods, results, discussion and conclusion will be drafted by Candice and circulated among authors for revision
- December 7, 2021
  - Revisions due; manuscript sent for English editing and ready for submission by December 31, 2021

Reminders

- The emphasis of this review paper is focusing on research gaps identified; therefore, please summarize those important publications if there is too many papers
  - Ex. in Web of Science, using “PM2.5” + “low-cost sensor” + “Taiwan” in the subject, I found 27 publications. I will only pick those published in good environmental journals and focus on those fit with our purposes
- Due to time limitations and the requirement for review paper (> 4000 words), just do as much as you can to submit your part before the deadline
- We need time to combine all the references and streamline all writings