ASSESSMENT OF BRICK-KILN INDUCED AIR POLLUTION IN BANGLADESH AND IMPACTS ON PUBLIC HEALTH

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1. BACKGROUND

The population size of Bangladesh is increasing rapidly. To accommodate this vast population, construction activities are increasing where brick plays an essential role. The growing Brick Kiln industry poses serious health threats to its surrounding population. Chronic exposure to the emitted contaminants causes respiratory illnesses and damage lung tissue [1]. Additionally, brick field workers have been seen to have bronchitis, asthma, and lung function disorders. In their research, [2] found carcinogenic dioxins and SO2 to be the most harmful emissions from brick kilns for human health. They are followed by Particulate Materials (PM), NOX, CO2, CO and fluoride compounds that are very harmful for human health.

2. OBJECTIVES

The primary objective of this study is to estimate the brick kiln induced air pollution and its health impact.

The specific objectives are:

1. To map spatial mean density of air pollutants and particulate matters on Bangladesh using Sentinel-5 Precursor (S-5P) data.
2. To map brick kiln density and to identify polluted areas with higher brick kiln density.
3. To install in-situ air pollution measurement instruments and to collect secondary data of the identified areas to estimate the share of air pollutants of brick kilns.
4. To conduct field survey to assess the health impact to those identified areas.

3. METHODS

The level of air pollution generated from brick kiln is investigated by estimating the spatial mean density of air pollutants and particulate matter and assessing the health impacts surrounding the brick kiln. Earth Observation techniques are used to map the areas and identify the polluted areas. Level 2 products from S-5P for calculation of the mean density of NO_2, SO_2, CO, CH_4, CH_2O, PM 2.5 and PM 10 is used along with secondary data from the Department of Environment (DoE) to map Brick kiln density followed by further field survey to locate the brick kilns outside of their database. Then by overlapping the air pollution map and brick kiln density map polluted areas with higher brick kiln density will be identified. Afterwards, data the ambient air quality monitoring network Bangladesh under the DoE, consisting of eleven (11) fixed Continuous Air Monitoring Stations (CAMS). Further in-situ air quality monitoring instruments will be installed to the places where CAMS are not available. Finally, based on structured field survey and KII the impact of brick kiln induced air pollution on human health will be assessed.

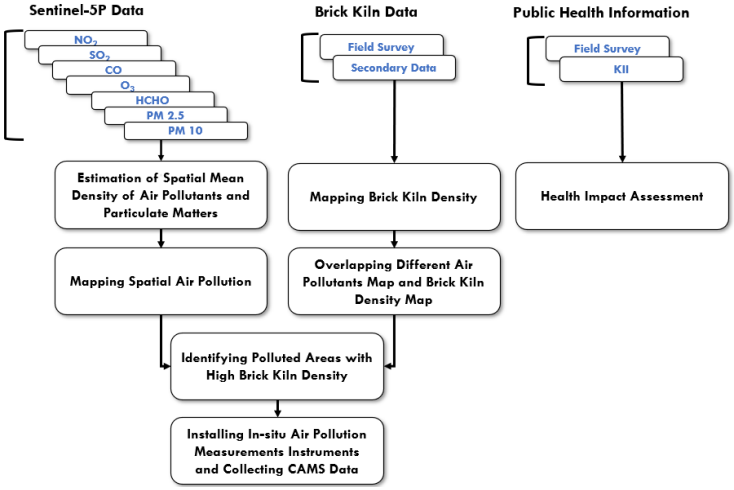

Figure 1. Methodological Framework for the study.

4. CONCLUSIONS

The aim of the study is to delineate the contribution of brick kilns to air pollution at a national scale and conduct a large-scale study on health impact assessment due to brick kiln induced air pollution. So, this study holds remarkable significance in addressing the air pollution of the brick kilns and its health impact and assist in proper policy development. Besides, the prospect of government and international investors in funding for brick kiln modification might increase based on the findings of this research. Since brick kiln workers are exposed to higher concentrations, hence occupational health risk evaluation can be carried out for the study area in future. Additionally, regulatory rules for the design, maintenance, and workplace risks associated with brick kiln industries are also recommended.

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