



706/E3

## Is an IoT based operational air quality monitoring system feasible in Sri Lanka?

Z. Iwais<sup>1</sup>, U. Adithya<sup>1</sup>, A. Munas<sup>1</sup>, N. Alahakoon<sup>1</sup>, D.H.K. Wickramasinghe<sup>1</sup>, L Zubair<sup>2,3\*</sup>  
and N. Devadasan<sup>2,3</sup>

<sup>1</sup>Tropical Climate Guarantee, Rajawella, Kandy, Sri Lanka

<sup>2</sup>Federation for Environment, Climate and Technology, Climate and Technology, Akurana, Kandy, Sri Lanka

<sup>3</sup>Foundation for Environment, Climate and Technology, New York, USA

Air pollution has risen inexorably in parts of Sri Lanka over the last decades and there is a need for authoritative information on prevailing air quality to inform mitigation actions. The availability of low-cost air quality sensors, Internet of Things (IoT) technologies, advances in air quality (AQ) and wind modeling, and information and communication technologies provide an opportunity for such information. Here, we report an effort to develop and operationalize such a system for AQ monitoring in Western Sri Lanka. Our goals were to: (i) provide detailed AQ monitoring, (ii) facilitate access to AQ information, and (iii) serve as a resource for research, education, and training. To this end, we reviewed low-cost air quality sensors, and calibrated four of the better rated instruments locally against an expensive EPA certified instrument in the US embassy in Colombo. The calibration for particulate (pm2.5, pm10) data showed excellent fidelity. Twenty of these instruments were deployed in Colombo, Puttalam, Kandy, Digana, Akurana, Nawalapitiya and Nachchaduwa where the impacts of various pollution sources (transport, industries, biomass burning and transboundary) and pollution transport (wind effects and topography) pose challenges and unique vulnerabilities. Using the online data streams, we present the monitored data in near-real time through portals at [www.cleanair.lk](http://www.cleanair.lk) and [www.fect.lk](http://www.fect.lk), trilingually. The travel restrictions, lockdown and security suspicions challenged our work in the last two years. Nonetheless, this work, has provided a proof-of-concept of the feasibility of IoT-based operational air quality monitoring system in Sri Lanka. Our portal was presented with a competitive award by the Information and Communication Technological Agency of Sri Lanka in 2020. Using data from our weather stations, we were able to use wind and particulate data for forensic analysis of pollution spikes in November 2019, impacts of covid curfews and impacts of xpress pearl ship fires. These efforts show that with modest resources, motivated personnel and support from citizens, one can sustain a state-of-the-art IoT enabled air quality system at pilot scale.

**Keywords:** IoT, air quality, instrumentation, environmental technologies

**Email:** [lareefzubair@gmail.com](mailto:lareefzubair@gmail.com)