Assessing Greenhouse Gas Emissions from Onsite Sanitation in Nepal using Modified Static Flux Chamber: An Innovative Approach

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In addition to being a crucial component for human and environmental well-being, sanitation has recently gained increasing attention with respect to the Greenhouse gas (GHG) emissions. Microbial decomposition of organic matter under anaerobic conditions, which is a typical process in onsite sanitation systems (OSS) generates GHGs, particularly methane,. For a low-income country like Nepal, where most households (83%) rely on OSS, assessing and reporting their contribution to national GHG emissions is essential to identify how to address this issue seriously. However, very few methods have been reported for emission measurement; with the majority of current emissions estimates rely on secondary data. There is a lackof empirical field-baseddata from actual in-situ systems. The Sanitation and Climate: Assessing Resilience and Emissions (SCARE) project is a multi-country study which has developed a standard methodology for real-time GHG emission measurement. This study uses the SCARE approach to generate a new data set for Nepal. A simple flux chamber typically used for GHG emission measurement from soil and landfill was slightly modified and calibrated in the Aquatic Ecology Center, Kathmandu University. It was subsequently used to measure emissions from 30 different OSS, including Pit latrines, Septic tanks, and Holding tanks, and a new set of emission data were recorded. So far, the measured emission trend has proven the modified static flux chamber to be an effective tool for estimating GHG emissions from the OSS. Also, after analyzing the preliminary data, it is evident that there is a significant variation in emissions rates, especially methane, among different types of OSS. Measurements are being made over several seasons to assess the device's performance and measurement quality comprehensively and estimate typical rates of emission from OSS in Nepal with greater confidence than was possible previously.

Key words: Greenhouse Gas, Methane, Carbon dioxide, Onsite Sanitation System.