



## Potential of greenhouse gas emissions from urban lakes recharged with STP effluent

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In the past few decades urbanization, changing rainfall patterns, and inadequate precipitation are a few of the major reasons for dried urban lakes. Many such lakes are successfully revived using effluent from nearby sewage treatment plants. However, high nutrient loading and concentrated surface flow leads to problems like eutrophication followed by high greenhouse gas emissions (GHG). Majority of these lakes are shallow which has higher GHG emissions compared to the deeper lakes. India's urban lakes are suffering from the similar fate. Study conducted in South Delhi, India reflects high phosphate and nitrate concentrations in the lake. Due to this, lakes are highly eutrophic and biomass concentration varies between 2 - 4.5 gL<sup>-1</sup>. Considering volume and biomass concentration, carbon dioxide sequestration comes out to be 1.2 Kg CO<sub>2</sub>/Kg of biomass. It was also seen that the average methane yield from microalgae is around 56%. It was found that total GHG potential was 5.856 Kg CO<sub>2</sub>-equivalent/ Kg of biomass which makes eutrophication a serious environmental issue. It is worth noting that microalgae in lakes decreases CO<sub>2</sub>, simultaneously increasing CH<sub>4</sub> emissions which has 27-30 global warming potential (GWP) and relatively harmful for environment. In the past few decades studies reflected CH<sub>4</sub> is responsible for 72 % of the climatic change (in CO<sub>2</sub>-equivalents) from lakes and inland waterbodies. The current study highlights the consequences of eutrophication in urban lakes with treated domestic discharge and suggests proper lake water quality management. Nevertheless, microalgae harvesting, and anaerobic digestion can be used to mitigate GHG and recover energy for a better and sustainable future.