

## ABSTRACT

Aulia Nur Asjad Firdaus. 24020122140210. **Urban Vegetation Diversity and Density and Their Relationship with Air Pollutant Concentrations (PM<sub>2.5</sub> and PM<sub>10</sub>) in the Special Capital Region of Jakarta.** Supervised by Fuad Muhammad and Aprilia Nurul Aini.

The growth of urbanization and increasing anthropogenic activities in the Special Capital Region of Jakarta have contributed to a decline in air quality, particularly through rising concentrations of fine particulate matter, namely PM<sub>2.5</sub> and PM<sub>10</sub>. On the other hand, the presence of Green Open Spaces (GOS) in urban areas has the potential to act as natural biofilters capable of capturing and depositing particulate matter through leaf surfaces and vegetation canopy structures. This study aims to analyze vegetation diversity and evenness in GOS, vegetation density distribution based on Normalized Difference Vegetation Index (NDVI) values, the distribution of PM<sub>2.5</sub> and PM<sub>10</sub> concentrations, and the relationship between vegetation density and air pollution levels in Jakarta Province. The study was conducted in five administrative cities of Jakarta. Vegetation data were obtained through plot sampling using 30 × 10 m transects and analyzed using the Shannon-Wiener diversity index ( $H'$ ) and the evenness index (E). Vegetation density was analyzed using Sentinel-2A satellite imagery from June–August 2025 to generate NDVI maps. PM<sub>2.5</sub> and PM<sub>10</sub> concentration data were obtained from Ambient Air Quality Monitoring Stations (SPKUA) and analyzed using the Air Pollutant Standard Index (ISPU). The relationship between vegetation density and particulate matter concentrations was analyzed using the Spearman Rank correlation test. The results indicate that vegetation diversity in Jakarta's green open spaces is moderate, with relatively high evenness in some locations, suggesting a fairly balanced distribution of individuals across species within the vegetation community. NDVI distribution reveals spatial variations in vegetation density across administrative regions. PM<sub>2.5</sub> and PM<sub>10</sub> concentrations in the study area generally fall into the moderate to unhealthy categories. Correlation test results indicate a weak negative relationship between vegetation density and PM<sub>2.5</sub>, as well as a moderate positive relationship between vegetation density and PM<sub>10</sub>; however, neither is statistically significant. Overall, urban vegetation has ecological potential to support air quality, but in a large city like Jakarta, its influence is affected by other factors such as transportation activities, population density, and atmospheric conditions.

**Keywords:** *Greenness Index, Urban Green Space, NDVI, Atmosphere Particulate.*