# Advancing Sustainable Cites; a GIS Based Evaluation of Urban Fuel Station Distributions in Ga Central Municipality, Ghana

**Priscilla Djaba (Ghana)**

**Key words:** Geoinformation/GI; Land distribution; Land management; Risk management; Spatial planning; Geographic Information Science; Spatial Planning; Disaster Management; Risk Mitigation

**SUMMARY**

Geographic Information Systems (GIS) have the potential to serve as a robust tool for evaluating the environmental consequences associated with the spatial relationship between fueling stations and residential facilities. The utilization of Geographic Information Systems (GIS) facilitated the acquisition and integration of diverse forms of spatial data. This study contributes to SDG 11 (Sustainable Cities and Communities) by examining fuel station distribution patterns in Ga Central Municipal Area. Using GIS-based buffer and point distance analyses, there was an integration of spatial data on fuel stations, residential areas, road networks, and population density to identify environmental risk zones. The study made use of data pertaining to the geographical distribution of fuel stations, residential areas, road networks, and population density. Buffer and point distance analysis were utilized to visually represent the scope of impact originating from fuel stations, thereby identifying regions that may be susceptible to pollutants, noise, and impacts on the environment. According to the research findings, a total of 51 residential properties were determined to be situated inside the restricted buffer zone of 30.8 meters, as per the criteria set by the National Petroleum Authority in Ghana. The collected data from residents regarding their perceptions of the environmental impacts of fuel stations located near residential facilities revealed that the primary concern expressed was the potential risk of loss of life and properties in the event of an explosion. Nevertheless, inside the Ga Central Municipal Area, there seems to be a deficiency in the rigorous observance of these precautionary measures. The potential for mishaps, such as fires and explosions, is greatly heightened when residential areas are in proximity to facilities engaged in the storage and processing of combustible fuels. Hence, it is crucial that the pertinent parties implement appropriate safety measures and laws to successfully mitigate these risks.

---