

令和2年度 環境科学院 修士論文内容の要旨

Land use land cover dynamics resulting from mining activities
in Kitwe District of Copperbelt Province, Zambia
(ザンビア, カッパーベルト州, キトウエ地区における採掘活動による
土地利用土地被覆のダイナミクス)

Graduate School of Environmental Science, Hokkaido University
Division of Environmental Science Development, GEM Course
MUTIMBA Kawisha

Commercial copper mines in Zambia have been in operation since 1928 when the first mine was opened and currently Zambia has eight (8) major underground mines, and five (5) major open pit mines operating in copper production. Kitwe District is one of the districts in Copperbelt which geologically falls within the Katanga Supergroup with high grade copper content. This region has witnessed land use land cover (LULC) changes due to copper exploration and consequently adverse impacts on the environment and health of local people. This study first mapped LULC by the use of Google Earth Engine (GEE) to assess the LULC dynamics resulting from mining activities in Kitwe District from 1990 to 2019 and then examined the environmental and health impacts of mining activities on the people of Kitwe District. Landsat TM (1990, 2000 and 2010) and OLI (2019) images as well as PlanetScope images were used, and Random Forest classifier algorithm in GEE was employed to detect the changes in proportion of LULC. Then, transition matrix and change rate were calculated for each of the LULC classes. The result of the analysis suggests that the built up, bare land, and open vegetation showed a constant increase in terms of composition and extent. On the other hand, grassland decreased, and closed vegetation was fluctuated. Classification of LULC was satisfactory with the overall accuracy and Kappa coefficients of 98.73% and 0.98%, respectively. The questionnaire survey was conducted with 200 respondents from 10 communities. The results suggested that the mining activities have led to land degradation and pollution in the Kitwe District, which has resulted into health complications with high prevalence of diseases such as malaria, diarrhoea, respiratory tract infections and skin diseases among others. This study provides important information useful for land resource management and for developing strategies to address the impacts of mines on the environment and health. Therefore, this study can help in decision making for land reclamation and land management in the Kitwe District and a country at large. It is further suggested that the government of Zambia should make conscious efforts to moderate the rate at which concessions are granted to mining companies in the country. All these measures should be fully incorporated into the mining policy of the country.