

The Correlation of Landuse Change and Flooding in Mukim Gadong, Brunei Darussalam

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Abstract. Flooding is a term commonly used to describe the overflow of excess water which submerges dry land. Flooding is one of the most common environmental hazards that often occur in some parts of Brunei Darussalam. This study investigated the urban flooding problem which often occurred in Mukim Gadong in the Brunei-Muara District. Mukim Gadong is one of the most dynamic hubs of trade and business in country's capital, Bandar Seri Begawan, hence the residential as well as multiple-use buildings abound. The combination of land-use changes with adverse weather causes flood in most cases in these areas.

Time series analyses of Landsat TM 1991, 1999 and 2002 images over Mukim Gadong were used. Normalized Difference Vegetation Indices (NDVI) were used to compare the changes in vegetation through the above-cited years. The derived NDVI values were observed to be decreasing through time. This phenomenon was highly correlated with the urban development derived from unsupervised classification methods using the same datasets.

This study also examined the relationship between high concentrations of impermeable surfaces/cementation as a consequence of built structures (i.e. buildings, roads and houses), with the occurrence flooding in Mukim Gadong. It also showed the likelihood of flooding in Mukim Gadong based on simulations using digital elevation models (DEM) derived from Shuttle Radar Topography Mission (SRTM) data.

Keywords: Landsat, flooding, DEM, NDVI,urban