DETECTION OF ACID SLUDGE CONTAMINATED AREA BASED ON NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI) VALUE

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ABSTRACT

The most frequent soil contamination was heavy metal and mineral waste of oil. Soil contamination by heavy metal take place as the serious problem in several countries. The solid form of oil heavy metal waste is known as acid sludge. The released acid sludge to the soil is not immediately degraded, but those material will be held and accumulated in the waste pond environment. The high concentration of acid sludge can be a *phytotoxic* to the crop. The acid sludge accumulation in the farming land will not only affect the quality of produced food but further it will influence the human health. The contaminant effect to the crop causes the vegetation weakness. The high concentration of acid sludge in the soil is a main factor which disrupt the vegetation grows on the affected location. The acid sludge will also impact the decomposition process of soil which in turn affect the soil fertile level and its production.

The aim of this research is to exercise the correlation between acid sludge concentration in soil and NDVI value, and further studying the NDVI anomaly by satellite images. The research area of acid sludge contamination is Balikpapan, East Kalimantan. The implemented method is *Normalized Difference Vegetation Index* (NDVI), means the ratio between Spectral Near Infra Red (NIR) minus the spectral Red (R), divided by the number of spectral NIR and spectral Red. The applied data in this research are Landsat-7 images up to 2012. The research area of acid sludge contamination is Balikpapan, East Kalimantan.

The remote sensing data in the research is used for calculating NDVI value based on the land use and separated based on season (dry and wet). On wet season, the NDVI value of 2002 to 2007 is fluctuated, where in 2002-2003 declines from 0.602113 to 0.393076, meanwhile on 2003 – 2007 increases, and on 2007 the NDVI reached 0.616776. On the dry season the NDVI of 2001 to 2005 is fluctuated, where on 2001 is 0.639819 and on 2005 is 0.676566. Further, the NDVI value on 2007 – 2012 continuously declines from 0.549498 to 0.298843. The high NDVI value shows the leaf healthy or thickness, where the low NDVI indicates the vegetation stress and rare which can be concluded as the evidence of contamination.

Key words: acid sludge, contamination, Normalized Difference Vegetation Index (NDVI)