World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:9, No:06, 2015

Spatial Assessment of Soil Contamination from Informal E-Waste Recycling Site in Agbogbloshie, Ghana

Authors : Kyere Vincent Nartey, Klaus Greve, Atiemo Sampson

Abstract : E-waste is discarded electrical electronic equipment inclusive of all components, sub-assemblies and consumables which are part of the product at the time of discarding and known to contain both hazardous and valuable fractions. E-waste is recycled within the proposed ecological restoration of the Agbogbloshie enclave using crude and rudimental recycling procedures such as open burning and manual dismantling which result in pollution and contamination of soil, water and air. Using GIS, this study was conducted to examine the spatial distribution and extent of soil contamination by heavy metals from the e-waste recycling site in Agbogbloshie. From the month of August to November 2013, 146 soil samples were collected in addition to their coordinates using GPS. Elemental analysis performed on the collected soil samples using X-Ray fluorescence revealed over 30 elements including, Ni, Cr, Zn, Cu, Pb and Mn. Using geostatistical techniques in ArcGIS 10.1 spatial assessment and distribution maps were generated. Mathematical models or equations were used to estimate the degree of contamination and pollution index. Results from soil analysis from the Agbogbloshie enclave showed that levels of measured or observed elements were significantly higher than the Canadian EPA and Dutch environmental standards.

Keywords : e-waste, geostatistics, soil contamination, spatial distribution
Conference Title : ICWM 2015 : International Conference on Waste Management
Conference Location : Copenhagen, Denmark
Conference Dates : June 11-12, 2015