

Application of Satellite Imagery and Digital Elevation Model in Soil-landscape classification and Mapping for the Cultivation of Orange and Purple Flesh Sweet Potato in Akwa Ibom State, Nigeria

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Abstract:

Soil-landscape mapping units are area of land having recognizable and specifiable topographies and soils with common potentials and limitations. This study assessed the application of satellite imagery and digital elevation model in soil-landscape mapping for the cultivation of orange and purple flesh sweet potato in Akwa Ibom State, Nigeria. 2021 Normalized Difference Vegetation Index (NDVI) imagery and Digital Elevation Model (DEM) of the study area were acquired from Space Centre, University of Uyo. Elevation map was generated from DEM and superimposed on the NDVI and classified to produce a base map. With the aid of hand held Global Positioning System (GPS) and random soil augering at some locations, mapping unit boundaries were established in the field. Four mapping units were delineated. Profile pits were sunk at representative locations within each mapping unit. A total of 15 profile pits were sunk, described in accordance with the FAO (2016) guidelines for soil profile descriptions and soil samples taken for laboratory analysis. Four suits of soil units were identified. They were Onna soil unit consist of Arenic Paleudult and Typic Dystrudept ; Ini soil unit was Typic Epiaquults; Uyo soil unit consist of Typic Paleudult and Typic Hapludult; and Ibiono soil unit consist of Arenic Hapludult, Typic Eutrudept and Typic Hapludult. By non-parametric method, currently and potentially, all the soil units were marginally suitable for orange and purple flesh potato cultivation. Climate was optimal while soil texture and CEC (Onna and Ibiono Ibom), drainage (Ini) and CEC (Uyo) were major limiting characteristics.

Keywords:

Soil-landscape, satellite imagery, DEM, orange and purple flesh potato, soils of Nigeria.