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INTEGRATED LANDFORM MAPPING AS A BASE FOR DIGITAL SOIL MAPPING AND LAND SUITABILITY ASSESMENT IN SOMALIA.

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Natural Resource inventory of remote areas of Somalia was one of the main goals of the FAO-SWALIM Project. Two study areas were chosen according to the population density distribution and to the presence of agriculture land use: one in the northwest and one in the southern part of the Country. The two areas have both difficult logistic and accessibility aspects due to the unresolved conflict environment. An integrated landform mapping approach was set up and tested in the two areas. It led to the creation of a new semi-detailed baseline (scales from 1:100.000 to 1:50.000) on landform among the other results (land cover, land use, soils types, and soil erosion). The landform mapping process was conducted exploiting most of the characteristics of the GIS environment (overlaying, transparency, spatial analysis, database management, etc), integrating many different data layers: topographic maps, geological maps, DEMs and their derived products, and multi-resolution, multispectral and multitemporal satellite imagery. A hierarchical landform legend was set up following the GeoPedologic approach (Zinck, 1988) adapting it to the use of Satellite imagery, geomorphometric analysis and to the Somali environment, and considering also other landform mapping systems like the FAO-SOTER approach (FAO, 1995) among the others. A semi-automated landform legend system was developed under the GIS environment, taking advantage of the ESRI Geodatabase domains characteristics, in order to help the image interpreters to perform their work. The two areas differing greatly in terms of climate, geology, morphology, vegetation, land cover and land use, proved to be good test sites for this approach. From a morphological point of view the northern area (western part of the former Somaliland) is characterized by a quite dissected topography, with elevation ranging from 0 to 1850 m a.s.l. The following main landscapes have been identified: coastal area, piedmonts, peneplains, hillands, mountainous areas, plateaus, and valleys. Three main climatic zones (pertaining to the Arid and Semiarid climates) follow the landscape subdivision. The southern area, corresponding to the lower part of the Jubba and Shabelle river basins, is characterized by a topography with elevation ranging from 0 to 750 m a.s.l.. The main Landscapes here found are alluvial plains, domed hilland, piedmont and valleys. This area is characterized by a higher value of rainfall than the northern one, still falling into the Semi-Arid climate. As a result two new landform maps and a semi-automated hierarchical landform legend under GIS environment were prepared. An enhancement of the GeoPedologic approach is also suggested. The landform maps were adopted as one of the fundamental layers for the Digital Soil Mapping, for the land suitability and for the soil erosion exercise. Further application of this methodology in different geological and morphoclimatic context and with different datasets is already ongoing by the authors. We acknowledge very much all the FAO-SWALIM staff and Dr. Zoltan Balint in particular, for the support during this research.

Key words: landform mapping, GIS and Remote Sensing, Somalia, Geo-Pedologic approach, Digital Soil Mapping