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Characterisation and Evaluation of Irrigable Bare Lands of the White Nile Region, Sudan

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Abstract

A total area of about 65,000 ha of the White Nile Region of Sudan was characterised and evaluated whether it can be irrigated from the White Nile and used for agricultural production of these poor areas. Therefore, 10 profiles and more than 5,000 soil samples were analysed to study different soil characteristics, especially the salinity and sodicity distribution in the area. Six different soil types were identified as to their variability in their landscape position, soil texture, soil pH and vertisolic characteristics. Four of these six soil types were classified as Vertisols and two as Aridisols.

The predominant limitations for irrigated agriculture were mostly related to their high content of smectitic clays (vertisolic limitations), to a high content of water soluble salts, and to a too high content of exchangeable sodium. In more than 50% of the area soluble salts were concentrated mainly in the top 30 cm of the soil profile. The salinity classes were mainly slightly to moderately saline (EC_e 4 to 16 dSm^{-1}). High contents of salts ($EC_e > 16 dSm^{-1}$) were found only in 1% of the total area and were mostly associated with depressional sites. Slightly to strongly sodic soils (SAR 8 to 38) occupied 30.4% of the total area in the depth of 0 to 30 cm, and 32.4% in the deeper soil layers, while strongly sodic soils (SAR > 38) represented 5% in the depth of 0 to 30 cm.

In general it could be seen that the current land suitability for irrigated agriculture in the White Nile Region of Sudan ranged from 56.1% of the identified land units as moderately suitable to 43.9% as marginally suitable.

Keywords: Land evaluation, salinity, sodicity, soil classification, soils of Sudan