



## **Surface soil crust types, properties and their response to ameliorants in the irrigated field of Eastern Ethiopia**

F. Kebede (1), E. Mekonnen (2), N. Taha (1), A. Verdoodt (3), and E. Van Ranst (3)

(1) Department of Land Resources Management and Environmental Protection, Mekelle University, P.O. Box 231 Mekelle, Ethiopia. , (2) Department of Natural Resource Management, Haramaya University, Ethiopia, (3) Department of Geology and Soil Science, Ghent University Krijgslaan 281 (S8), B-9000 Gent, Belgium

Soil crusting is a worldwide problem occurring under a wide range of soil and climatic conditions. Soil crusts affect seedling emergence and reduce the infiltration rate causing loss of water and crop yield. Field experiment was conducted in Kombolcha, East Harerge to identify soil crust types and soil ameliorants for crust management under basin and furrow irrigation conditions. The experiment was conducted on plots of 12 m<sup>2</sup> (4 m x 3 m) and arranged in RCBD with three replicates. Eight treatment combinations were considered namely: the control (without amendment), FYM, chat residue (decayed leaves of *Chata edulis*) and sediment (sub surface inorganic material locally called 'decay dimma'). Additionally, field and laboratory methods were employed to study types of surface soil crust. The study revealed that still depositional crust and slaking structural crust types were found as major forms of soil crusts. They are formed from deposition of water suspension on to irrigated land and subsequent slaking of colloidal materials. Furthermore, plots amended with FYM and chat residues made compost were significantly ( $p < 0.05$ ) improved their moisture content and infiltration rate over the sediment amended plots and the control. Results have also revealed that improvement of infiltration rate, bulk density, porosity and water holding capacity was attained over the compost amended plots. The study concludes that use of chat residue made compost, FYM and the locally known mineral sediment (dicay dimma) are reasonable resources for minimizing structural degradation.

**Keywords:** Soil ameliorant, irrigation practices, organic compost, soil crust, water suspension, and