

SOIL CLASSIFICATION IN A MINING AREA

BY

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INTRODUCTION

Definition of soil and categorization

Soil is generally defined as the natural body that covers the earth's surface and is made up of mineral and organic materials (Soil Survey Staff, 1992, Soil Survey Staff, 1960x). The most important property for agricultural land evaluation is its capacity to support vegetation. In this sense soil could be defined as the part of the earth's surface that has the potential to host and influence plant roots. Soil per se is a variable continuity in space and time. To have an entity that can be handled, described, and dealt with, the term 'pedon' was introduced (Simonson & Gardner, 1960) as a locally existing set of properties that is more or less constant over some decameters. It is usually this set that is referred to as the 'soil'. It is described, at a given point as a vertical arrangement of horizons, artificially introduced horizontal layers which are assumed to have distinct characteristics. The horizon itself is not a homogeneous body, it can be characterized by repetitive patterns of inhomogeneities such as concretions, mottles and clay lenses. The common use of the term horizon implies the existence of such a distinct sequence of property arrangements and thus a statistic homogeneity over a certain distance. The delineation and description of horizons is the base for most common classification systems, e.g. FAO (1988), AG Boden (1994), Soil Survey Staff (1992). The horizon is commonly regarded as a homogeneous vertical partition of soil (Jones, 1959) formed by pedogenetic processes. Soil description is in consequence restricted to characterizing soil as a one-dimensional discretized object with a set of determined parameters and represented by a matrix. The measured and described parameters give the columns of the matrix, the horizons its rows. Categorization is per se a tool to structure the observations of objects (Baize, 1986). It brings a grammar into the exchange of knowledge that was absent in the preclassification era (Wilde, 1953). It is further used for data reduction. It is much more efficient to speak of an object as belonging to a certain category than to describe all its features in detail. Moreover, categorization is widely used for the extrapolation of properties. It is commonly assumed that properties observed for a certain number of objects are also present in other bodies of the same category.

Categorization is used in two distinct ways: spatial and local (Jalagne, 1993). Spatial categorization is what is used in mapping, where a point in space is said to belong to a certain entity. Local categorization is the realm of classification where a pedon is classified as belonging to a certain soil class.

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