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## Covariates selection assessment for field scale digital soil mapping in the context of precision fertilization management

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The application of digital soil mapping in precision agriculture is extremely important, since an assessment of the spatial variability of soil properties within cultivated fields is essential in order to optimize agronomic practices such as fertilization, sowing, irrigation and tillage. In this context, it is necessary to develop methods which rely on information that can be obtained rapidly and at low cost. In the present work, an assessment is carried out of what are the most useful covariates to include in the digital soil mapping of field-scale properties of agronomic interest such as texture (clay, sand, silt), soil organic matter and pH in different farms of the Umbria Region in Central Italy. In each farm a proximal sensing-based mapping of the apparent soil electrical resistivity was carried out using the EMAS (Electro-Magnetic Agro Scanner) sensor. Soil sampling and subsequent analysis in the laboratory were carried out in each field. Different covariates were then used in the development of digital soil maps: apparent resistivity, high resolution Digital Elevation Model (DEM) from Lidar data, and bare soil and/or vegetation indices derived from Sentinel-2 images of the experimental fields. The approach followed two steps: (i) estimation of the variables using a Multiple Linear Regression (MLR) model, (ii) spatial interpolation via prediction models (including regression kriging and block kriging). The validity of the digital soil maps results was assessed both in terms of the accuracy in the estimation of soil properties and in terms of their impact on the fertilization prescription maps for nitrogen (N), phosphorus (P) and potassium (K).