



Soil quality indicators and indices to assess the effects of land-use changes in the northeast of Argentina

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The objective of this work was to select indicators and develop indices to evaluate soil quality and thus be able to determine the effects of replacing natural pastures with forest systems in vulnerable environments. The experiment was carried out in Inceptisols of Corrientes, a province located in the northeast of Argentina. In order to obtain indicators and develop indices, we used both natural systems (natural pasture, M) and systems cultivated with exotic species (*Pinus* sp.). A completely randomized design was established at the department of Ituzaingó (Corrientes). The methodological approach consisted in determining a reference level against which changes in soil quality were compared and quantified. Climax vegetation (natural pastures) soils were taken as high-quality reference soils. The cultivated system included a forest plantation with 17-year-old *Pinus* sp. In each case, composite samples were collected at random to the 0-0.10 m depth. The following edaphic variables were determined: bulk density (Da), texture, silt (Li) and clay proportion (Arc), pH, total organic carbon (COT), potentially mineralizable nitrogen (NPM), and soil respiration (RES). On the other hand, the indices for COT/Li+Arc, NPM/RES, NPM/MO and IRC (index of carbon reserve) were determined by calculation. All data were analyzed through ANOVA, and the means were reckoned by the LSD Test ($p < 0.05$). The RES, NPM and COT indicators, and all soil quality indices obtained were sensitive to anthropic disturbances and effective enough to quantify soil quality and to assess the effects of land-use changes. Replacing the natural vegetation with *Pinus* sp. plantations increased soil acidity, decreased respiration rate (23%) and NPM content (70%) and affected organic matter turnover. Forest land-use, hence, resulted in soil degradation and poorer soil quality.