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Assessment of the soil quality as a complex of productive and environmental soil function potentials

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<https://doi.org/10.17221/39/2009-SWR>

Citation: Novák P., Vopravil J., Lagová J. (2010): Assessment of the soil quality as a complex of productive and environmental soil function potentials. *Soil & Water Res.* 5: 113-119.

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Soil quality is a measure of the ability of soil to carry out particular ecological and plant productive functions. It reflects the combination of chemical, physical, and biological properties. Some of the soil properties are relatively more important than the others and unchangeable. Others can be significantly changed by human activity. Nowadays, three groups of soil functions are usually defined: soil utility function (productive function, infrastructure area, source of materials); functions of soil in the environment (non-productive functions such as: water infiltration and water retention, transport of matter, buffering and sanitary functions); soil cultural function (history of nature and humans). The cultural function is, from our point of view, different from the others. The complex assessment of the soil quality is the topic of this paper and includes both the productive and environmental functions. The productive function (productive potential) of Czech soils has been long studied and is \pm known. It is expressed by means of a one-hundred-point scale in the Czech Land Evaluation System. Its point values depend on different soil and local characteristics together with the natural conditions and their influence on the plant production. A similar principle was used for the assessment of the non-productive soil functions. The importance of the individual soil characteristics is defined. The values of the environmental soil function potentials are determined from the common soil characteristics and are compared with the values of the soil productive potential. Total soil quality can be then expressed as the average or as the sum of the points for all individual functions. Some selected function can be preferred by increasing its value coefficient for a specific land use area (for example, an area for obtaining underground water). Three texturally different forms of Chernozem (middle textured, clayic, arenic) which correspond to the Main Soil Units of the Czech Land Evaluation System are given as an example of the assessment. The evaluation of the total soil quality would then involve not only the agricultural and locality determined financial values but also an assessment of all environmental functions of the soil.

Keywords:

ecological soil functions; points scale; soil characteristics; soil value assessment

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Impact factor (Web of Science Thomson Reuters)

2017: 0.882

5-Year Impact Factor: 1.11

SJR (SCImago Journal Rank SCOPUS)

2017: 0.379 – Q3 (Aquatic Science)

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