Qeios

Peer Review

Review of: "Spatial Analysis of Soil Fertility Using Geostatistical Techniques and Artificial Neural Networks"

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Reviewer Comments on Abstract

General Assessment:

The abstract presents a relevant and timely study focused on spatial soil fertility assessment using geostatistics and artificial intelligence. The integration of traditional soil analysis with AI-based classification (FKCN) is both innovative and practical for advancing precision agriculture. The methodology is sound, and the results are promising, particularly the high reliability scores for both the individual soil maps and the integrated fertility classification.

Strengths:

Clarity of Purpose: The objective of the study is well-stated — to create a spatially detailed fertility classification to support precision fertilization.

Methodological Rigor: The use of systematic sampling, ordinary kriging, and artificial neural networks adds scientific robustness.

Integration of Technologies: Combining geostatistics with AI demonstrates a multidisciplinary approach that is increasingly valuable in soil science.

Validation: Including cross-validation results adds credibility to the outputs and supports the reliability of the model.

Practical Relevance: The outcomes have clear implications for agricultural management, especially in tailoring inputs to soil variability.

Areas for Improvement:

doi.org/10.32388/IGKNMT

Language and Style: While generally clear, the abstract could benefit from tighter phrasing and more active voice to improve readability. Phrases such as “a fundamental basis” or “capable of generating information” can be streamlined.

Results Detail: The mention of five fertility categories is useful, but a brief explanation of their significance (e.g., high to low fertility) would add context.

AI Technique Justification: A short rationale for selecting the FKCN algorithm over other clustering or classification methods would strengthen the abstract’s methodological foundation.

Contribution Emphasis: The abstract could more clearly articulate what differentiates this work from similar studies in the field.

Recommendation:

The abstract outlines a valuable study with strong methodological grounding and practical applications. With minor revisions for clarity and context, it would be well-suited for publication or presentation in a scientific venue related to agronomy, soil science, or precision agriculture.

Declarations

Potential competing interests: No potential competing interests to declare.