Does spatial autocorrelation matter for sustainable regional development planning and evaluation?

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ABSTRACT Pursuing the various existing stainability dimensions obliges leaders of society to engage in more comprehensive monitoring of collective economic and other supplies and demands, particularly in a geographic context. In turn, the affected inputs, outputs, resources/goods/services stocks, and generated garbage/trash waste, which all exist and are tagged implicitly or explicitly in geographic space, are definite harborers of spatial autocorrelation. Harnessing this nearly ubiquitous georeferenced data property implants a capability of fostering efficient and effective sustainability ventures. Tessellation stratified random sampling to monitor environmental pollution alludes to one example of this assertion. This paper illustrates this exemplification with an examination of 2023 air quality data for Poland. In doing so, it translates a framework build upon idealized tessellations into one for the administrative districts of Poland; this methodological conversion enables governmental organizations to participate in and oversee any intended monitoring without additional jurisdictional complications. Serendipitous academic discoveries include an initial extension of the set of standard polygon shapes (e.g., square and hexagon) to the trapezoid for spatial sampling purposes, and the possibility that spatial autocorrelation impacts upon design-based statistics may far outweigh a violation of the conventional random sampling equiprobable commandment. Finally, the discerning conclusion reached through the analyses summarized in this exposé argues that spatial autocorrelation does matter for sustainable regional development planning and evaluation.