

**CURRENT STATE AND TRENDS OF DEVELOPING NEW METHODS FOR QUANTITATIVE
ASSESSMENT OF WITHIN-FIELD HETEROGENEITY FOR PRECISION AGRICULTURE**

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The main concept of precision agriculture (PA) is based on the adaptation of technological operations to the spatial heterogeneity of a single agricultural field. The key points in the transition to the PA system are assessing and understanding the spatial variability in soil and crop properties, developing the tool for quantitative description of the variabilities and identifying the variability boundaries on a given territory. New approaches based on variogram analysis of satellite data and optical criteria, characterizing the spectral parameters of crops under the influence of various stressors, are proposed with due consideration of the efficiency assessment of PA methods to detect the within-field heterogeneity. A description of scientific, technical and technological infrastructure necessary for field research to achieve the feasibility of the developed methods is presented. Preliminary results of obtaining reference information with mobile ground-based information systems and unmanned aerial vehicles equipped with geoinformation and navigation systems are considered.

Keywords: precision agriculture, within-field heterogeneity, soil survey, mobile systems, remote sensing, optical criteria of plants.