
REVIEWER 1.

Comments and Suggestions for Authors (general). The article, titled "Digital Transformation in Agriculture: Impact of Drones and Advanced Sensors on Monitoring and Sustainable Productivity in Peanut Cultivation (*Arachis hypogaea*)" presents an important approach and a significant contribution for the use of aerial imagery based on precision agriculture tools. Some suggestions are presented in the appendix to clarify important points of the research.

Response to Reviewer 1 — Comment General. Thank you very much for your positive assessment and for recognizing the contribution of our work to precision agriculture using aerial imagery. We appreciate the additional suggestions provided and will carefully address each point in the appendix to clarify and strengthen the key aspects of the research.

Comment 1. In general, the treatments presented in the abstract are not found in the methodology of the work, and this needs to be revised in the discussion.

Response to Reviewer 1 — Comment 1. Thank you for this helpful comment and for pointing out the inconsistency between the abstract and the methodology. We agree that the description of the treatments needed clarification. To address this, we now explicitly refer in the text to the detailed experimental design and treatment characteristics presented in Table A1 (Appendix). In addition, we have added a new paragraph to Section 2.2 to clearly describe the treatments. These changes ensure consistency between the abstract, methodology, and discussion regarding the treatments evaluated in the study.

Comment 2. The article's title may be considered impressive and attractive, but it doesn't accurately reflect the study's approach. It doesn't utilize advanced sensors for monitoring, such as a multispectral camera; instead, it employs equations and models. Without intending to detract from the research, but merely seeking to illustrate the focus of the investigation, I suggest a revised title, given that a thorough approach is undertaken using data collection equipment considered relatively simple for diverse audiences, thus highlighting the applicability of this research.

Response to Reviewer 1 — Comment 2. We thank the reviewer for this accurate and constructive observation. We agree that the original title overstated the technological scope of the study. No multispectral or advanced sensors were used; all spectral data were derived mathematically from standard RGB imagery (DJI Phantom 4 Pro), and predictions were made using Random Forest and KNN models.

Accordingly, the title has been revised to: *"UAV-Borne RGB Imagery and Machine Learning for Estimating Soil Properties and Crop Physiological Traits in Peanut (Arachis hypogaea) Cultivation: A Low-Cost Precision Agriculture Approach".*

This revision accurately reflects the sensor used, the analytical framework, the target variables, and the accessible nature of the methodology.

Comment 3. Abstract: The abstract eliminates the materials and methods section; a small space is needed for that. The abstract's structure needs restructuring; there's a lack of balance between the sections. Too much results information is presented; focus

on the most relevant, and this change creates space for other sections, such as the methodology.

Response to Reviewer 1 — Comment 3. Thank you for your careful suggestions regarding the abstract structure and balance. We agree that the abstract previously overemphasized the results and did not clearly separate the objective and methodological elements. In response, we have rewritten the abstract to: (i) explicitly state the main objective in the first description of the study, (ii) briefly summarize the experimental design and analytical approach in one concise methods sentence, and (iii) focus the results section only on the most relevant findings. We have also removed the example in line 23 and avoided unnecessary detail on specific equipment, in accordance with your recommendation and the 200-word limit of the journal.

Comment 4. Introduction: The abstract section mentions the use of two tillage methods; therefore, I suggest adding at least one paragraph on this topic to the introduction to guide the study.

Response to Reviewer 1 — Comment 4. We thank the reviewer for this pertinent observation. We agree that the introduction lacked context on tillage systems, which are a key treatment factor in this study. Accordingly, we have added a new paragraph in Section 1 (Introduction), after the paragraph describing peanut agronomic management, briefly discussing the contrasting effects of conventional and zero tillage on soil physical and chemical properties in peanut cultivation, and justifying their relevance for UAV-based spectral monitoring.

Comment 5. Materials and Methods: In the materials and methods section, essential information is omitted; for example, there is no paragraph specifically outlining the treatments used in the research.

Response to Reviewer 1 — Comment 5. We thank the reviewer for identifying these omissions in the Materials and Methods section. In response, we have added a dedicated paragraph at the beginning of Section 2.2 that now explicitly describes: (i) the full factorial design (4×2×2) and number of treatment combinations, with a cross-reference to Table A1 (Appendix); (ii) the individual plot and total study area dimensions; (iii) the four INIAP peanut varieties used as Factor A; and (iv) the specific soil preparation procedures for both tillage systems (zero tillage and conventional tillage with moldboard plow at 15 cm depth). We believe these additions provide the methodological clarity required to fully understand the experimental framework.

Comment 5.1. Materials and Methods: A total of eleven edaphic characteristics were analyzed, as described below. All equations and information are consistent; however, there is no description of how these samples were collected. Were they disturbed or undisturbed samples? If undisturbed, was the collection done using volumetric rings? If so, was the collection done manually or mechanically? Was there a specific location within the plot for collection? This information should be provided.

Response to Reviewer 1 — Comment 5.1. We thank the reviewer for this important observation. We agree that the sampling protocol was insufficiently described. We have added a dedicated paragraph in Section 2.2, immediately before the description of the soil parameters, specifying: (i) sampling depths and number of collection points per plot; (ii) the use of stainless-steel volumetric cylinders for undisturbed samples (physical properties) and composite disturbed samples for chemical analyses; (iii) the manual collection procedure; and (iv) the timing of soil sampling relative to the phenological stage and UAV flight missions.

Concerning the format, we thank the reviewer for this observation. The formatting of the tittle for Tables 1 and 2 has been revised accordingly to ensure consistency and compliance with the journal's style guidelines.

We thank the reviewer for these two precise observations about the time flight and the QGIS version. Regarding Table 2, the flight time has been added as a new parameter row. Both UAV missions were conducted between 10:00 and 11:00 a.m. local time. Regarding Line 247, the QGIS software version has been specified as QGIS 3.44.x "Solothurn", as requested, to ensure full methodological reproducibility. Both situations are already adjusted in the manuscript.

Comment 6 Results and discussions. The discussion can be explored further, for example in lines 300-332, exploring the reason for the low reflectance values.

Response to Reviewer 1 — Comment 6. We thank the reviewer for this observation. We agree that the discussion of low reflectance values required a more substantive explanation. We have added a paragraph explicitly discussing the three main causes in section “3.2.1. RGB Spectral Index Calculations “: (i) minimal canopy cover at the early vegetative stage, with spectral signal dominated by bare soil; (ii) the intrinsic behavior of indices such as RGBVI and MGRVI under low vegetation cover conditions; and (iii) the radiometric limitations of 8-bit RGB imagery.

Comment 6.1. Page 12 is blank; remove it.

Response to Reviewer 1 — Comment 6.1. Done!

Comment 6.2. Lines 358-362 take a soil-based approach; since this research has two soil systems, it is important to specify whether this discussion focuses on one specific system or encompasses both models. I suggest expanding the discussion for each type, as the behaviors are likely different, especially regarding soil cover.

Response to Reviewer 1 — Comment 6.2. We thank the reviewer for this important observation. We agree that the discussion in Section 3.2.3 did not adequately distinguish between the two soil management systems included in the experiment. We have added a paragraph at the end of Section 3.2.3 that explicitly addresses the differential spectral behavior observed under zero tillage (T1-T8) and conventional tillage (T9-T16) treatments. The new text discusses how each system generates distinct surface conditions; greater heterogeneity and organic matter exposure under ZT versus more uniform and brighter surfaces under CT; and how these are reflected in chromatic and vegetation indices from Table B2 (Appendix). The paragraph concludes by clarifying that while tillage contributes to spectral variability, the study's primary objective remains the evaluation of RGB indices as proxies for crop and soil monitoring.

Comment 6.3. Lines 448-450: I understand that this is a discussion from the perspective of the use of tools, but no chemical analysis is presented and evaluated in this research; therefore, stating that these indices are effective in predicting chemical characteristics of the soil may be too bold.

Response to Reviewer 1 — Comment 6.3. We thank the reviewer for this specific and accurate observation. The original paragraph overstated the capacity of RGB indices to estimate soil *chemical* properties, which were not independently validated in this study. We have revised the paragraph to soften this claim, distinguishing clearly

between soil *physical* properties, where correlations were more directly supported, and soil *chemical* attributes, which are treated as exploratory associations requiring further validation. The practical value of RGB indices for accessible soil monitoring is retained, but framed more cautiously and accurately.

Comment 6.4. Subtitle 3.3 is incorrect because nothing chemical is presented for discussion.

Response to Reviewer 1 — Comment 6.4. Done! We have delated the words: “chemical and physical” from Subtitle 3.3.