

**Review Form 1.7**

Journal Name:	<b>Journal of Agriculture and Ecology Research International</b>
Manuscript Number:	<b>Ms_JAERI_119857</b>
Title of the Manuscript:	<b>Optimizing Input management practices for sustainable Maize Production</b>
Type of the Article	

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**PART 1: Review Comments**

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<p><b>Compulsory REVISION comments</b></p> <p><b>1. Is the manuscript important for scientific community?</b> (Please write few sentences on this manuscript)</p> <p><b>2. Is the title of the article suitable?</b> (If not please suggest an alternative title)</p> <p><b>3. Is the abstract of the article comprehensive?</b></p>	<p>Based on the search results, here are the key points for optimizing input management practices for sustainable maize production:</p> <p><b>Sustainable Nitrogen Management</b></p> <ul style="list-style-type: none"> <li>• Adopt split nitrogen application, applying a portion at planting and the remainder at key growth stages (e.g., 50% at planting, 25% at knee-high, 25% at tasseling).</li> <li>• Explore the use of nitrification inhibitors and controlled-release nitrogen fertilizers to improve nitrogen use efficiency and reduce losses.</li> <li>• Integrate organic sources of nitrogen (e.g., manure, compost) with inorganic fertilizers to improve soil health and nutrient cycling.</li> </ul> <p><b>Conservation Tillage Practices</b></p> <ul style="list-style-type: none"> <li>• Promote no-till or minimum tillage systems to enhance soil organic matter, reduce erosion, and improve water infiltration.</li> <li>• Use cover crops and crop residue management to protect the soil and promote carbon sequestration.</li> </ul> <p><b>Precision Agriculture Technologies</b></p> <ul style="list-style-type: none"> <li>• Utilize precision farming tools, such as GPS-guided applications, variable-rate technology, and remote sensing, to optimize input applications and reduce waste.</li> <li>• Adopt smart irrigation systems and soil moisture monitoring to improve water use efficiency.</li> </ul> <p><b>Integrated Pest Management (IPM)</b></p> <ul style="list-style-type: none"> <li>• Implement IPM strategies, including the use of resistant cultivars, biological control, and targeted pesticide application, to minimize environmental impacts.</li> <li>• Monitor pests and diseases regularly and make data-driven decisions on pest management.</li> </ul> <p><b>Crop Diversification and Rotation</b></p> <ul style="list-style-type: none"> <li>• Incorporate crop rotation and intercropping to improve nutrient cycling, suppress weeds and pests, and enhance biodiversity.</li> <li>• Explore the use of drought-tolerant, disease-resistant, and nutrient-efficient maize cultivars.</li> </ul> <p><b>Policy and Institutional Support</b></p> <ul style="list-style-type: none"> <li>• Provide financial incentives, subsidies, and extension services to encourage the adoption of sustainable maize production practices.</li> <li>• Foster collaboration among farmers, researchers, government agencies, and private sector stakeholders to promote knowledge sharing and collective action.</li> </ul> <p>By implementing a holistic approach that combines improved nitrogen management, conservation tillage, precision agriculture, IPM, and crop diversification, farmers can optimize input use, enhance productivity, and minimize the environmental footprint of maize production, thereby achieving sustainable intensification.</p> <p>If an alternative title were to be suggested, one option could be: "Sustainable Strategies for Optimizing Maize Production through Improved Input Management" This alternative title maintains the core focus on optimizing input management for sustainable maize production but reframes it slightly to emphasize sustainable strategies and the goal of optimizing maize production more broadly. However, the original title is already quite suitable and comprehensive, so an alternative title may not be necessary.</p> <p>The abstract provided is comprehensive and covers the key aspects of the study. However, there are a few areas that could be improved:</p>	

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<p>4. Are subsections and structure of the manuscript appropriate?</p> <p>5. Do you think the manuscript is scientifically correct?</p>	<p>1. <b>Clarity and Conciseness:</b> The abstract is quite lengthy and could be made more concise by removing some of the unnecessary details. For example, the specific treatment details could be summarized more briefly.</p> <p>2. <b>Emphasis on Objectives:</b> The abstract could be strengthened by placing more emphasis on the main objective of the study, which is to evaluate the effect of different input management practices on growth parameters, biomass production and yield of maize.</p> <p>3. <b>Highlighting Key Findings:</b> The abstract could be improved by more clearly highlighting the key findings, such as the superior performance of the N6 treatment compared to the farmer's practice (N7) in terms of growth parameters, biomass production and yield.</p> <p>4. <b>Conclusion and Recommendation:</b> The abstract could be strengthened by providing a more concise and impactful conclusion that clearly states the practical implications of the findings, such as the recommendation that the N6 treatment with SPAD-based nitrogen management and insecticide application can be an effective practice for maximizing maize productivity.</p> <p>Here is a suggested revised abstract that addresses these points: Revised Abstract:</p> <p>A field experiment was conducted to evaluate the effect of different input management practices on the growth, biomass production and yield of maize. The study was carried out during the rabi seasons of 2021-22 and 2022-23 at the Agricultural Research Farm, Bihar Agricultural University, Sabour, Bhagalpur. The experiment was laid out in a randomized block design with three replications. Seven nutrient management practices were tested in combination with pest management practices. The treatments included a 100% recommended dose of fertilizers (RDF) through inorganic sources, 50% RDF through inorganic and 50% through organic sources, SPAD-based nitrogen management, and the addition of insecticide application. The results showed that the treatment with SPAD-based nitrogen management and insecticide application (N6) resulted in the highest plant height (200.3 cm at 120 DAS), leaf area index (4.5 at 90 DAS), biomass production (19,156 kg ha<sup>-1</sup> at harvest) and crop growth rate (24.2 g m<sup>-2</sup> day<sup>-1</sup> at 90-120 DAS). This treatment also recorded the maximum total biomass (19,538.33 kg ha<sup>-1</sup>), stover yield (7,103.33 kg ha<sup>-1</sup>), grain yield (9,896.67 kg ha<sup>-1</sup>), and harvest index (49.65%), which were significantly superior to the farmer's practice (N7). In conclusion, the nutrient management practice with SPAD-based nitrogen management and insecticide application can be an effective tool for maximizing the productivity of the maize crop.</p> <p>They should be set according to the guidelines of journal authors.</p> <p>Based on the information provided in the materials and methods section, there are a few potential issues and ways to address them:</p> <ol style="list-style-type: none"><li><b>Lack of detail on the SPAD-based nitrogen management approach:</b><ul style="list-style-type: none"><li>The abstract and methods mention using a "critical threshold value for SPAD reading of 46.1", but more details are needed on how this SPAD-based approach was implemented.</li><li>Provide more specifics on the SPAD measurement protocol, frequency of measurements, and the decision rules for applying supplemental nitrogen based on the SPAD readings.</li></ul></li><li><b>Insufficient information on the organic nutrient sources:</b><ul style="list-style-type: none"><li>The methods state that vermicompost was used as the organic nitrogen source but do not provide details on the application rates or nutrient composition of the vermicompost.</li><li>Include more information on the organic nutrient sources, such as the application rates, nutrient analysis, and how they were incorporated into the treatments.</li></ul></li><li><b>Lack of details on pest management practices:</b></li></ol>	
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<p>6. Are the references sufficient and recent? If you have suggestion of additional references, please mention in the review form.</p> <p><u>(Apart from above mentioned 6 points, reviewers are free to provide additional suggestions/comments)</u></p>	<ul style="list-style-type: none"><li>○ The methods mention the use of the insecticide Chlorpyrifos 20 EC, but do not provide specifics on application rates, timing, or pest pressure observed in the experiment.</li><li>○ Expand the details on the pest management practices, including pest monitoring, thresholds for application, and any observed pest incidence or damage.</li></ul> <p>4. Clarification on the experimental design:</p> <ul style="list-style-type: none"><li>○ The methods state that the experiment was laid out in a randomized block design, but it is not clear if this was a single experiment conducted over two seasons or two separate experiments.</li><li>○ Clearly specify if this was a single experiment repeated over two seasons or two distinct experiments, and provide more details on the experimental design, such as plot sizes, number of replications, and any other relevant information.</li></ul> <p>5. Justification for the chosen treatments:</p> <ul style="list-style-type: none"><li>○ The rationale for selecting the specific nutrient management and pest control treatments is not clearly explained.</li><li>○ Provide more context on why these particular treatments were chosen and how they represent a range of management practices relevant to the research objectives.</li></ul> <p>Addressing these issues would help strengthen the scientific rigour and clarity of the materials and methods section. Overall, the manuscript appears to be scientifically sound, but these additional details would improve the reproducibility and interpretation of the study.</p> <p>The references provided in the manuscript appear to be sufficient and recent, covering relevant aspects of maize production and nutrient management. However, there are a few suggestions for additional references that could further strengthen the manuscript:</p> <ol style="list-style-type: none"><li>1. More recent references on sustainable maize production practices:<ul style="list-style-type: none"><li>○ Nisar, S., Mavi, M.S., Singh, J., &amp; Dey, P. (2023). Integrated nutrient management in spring-maize improves yield, nutrient use efficiency and minimizes greenhouse gas intensity. <i>Archives of Agronomy and Soil Science</i>, 69(13), 2522-2536.</li><li>○ Bhandari, M.K., Regmi, N.R., Sahani, H., Shepra, P., &amp; Panthi, B. (2021). Integrated nutrient management in maize production: A review. <i>Reviews in Food and Agriculture (RFNA)</i>, 2(1), 27-30.</li></ul></li><li>2. Studies on the impact of SPAD-based nitrogen management in maize:<ul style="list-style-type: none"><li>○ Mohapatro, S., Shankar, T., Maitra, S., Pal, A., Nanda, S.P., Ram, M.S., &amp; Panda, S.K. (2020). Growth and Productivity of Maize (<i>Zea mays</i> L.) as Influenced by Nitrogen Management Options. <i>International Journal of Agriculture, Environment and Biotechnology</i>, 14(2), 207-214.</li><li>○ Jat, M.L., Satyanarayana, T., Majumdar, K., Parihar, C.M., Jat, S.L., Tatarwal, J.P., &amp; Jat, R.K. (2013). Fertilizer best management practices for maize systems. <i>Indian Journal of Fertilizers</i>, 9(4), 80-94.</li></ul></li><li>3. Broader reviews on nutrient management in maize:<ul style="list-style-type: none"><li>○ Kumar, R., Kumawat, N., Kumar, S., Singh, A.K., &amp; Bohra, J.S. (2017). Effect of NPKS and Zn fertilization on growth, yield and quality of baby corn-a review. <i>International Journal of Current Microbiology and Applied Sciences</i>, 6(3), 1392-1428.</li><li>○ Singh, S., &amp; Misal, N.B. (2022). Effect of different levels of organic and inorganic fertilizers on maize (<i>Zea mays</i> L.). <i>Indian Journal of Agricultural Research</i>, 56(5), 562-566.</li></ul></li></ol> <p>These additional references would provide more comprehensive coverage of the latest research on sustainable maize production practices, SPAD-based nitrogen management, and the broader context of nutrient management in maize cultivation. This would further strengthen the scientific basis and relevance of the manuscript.</p>	
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	<p>Based on the information provided in the materials and methods section, here are the key statistical problems and defects that could be addressed in this manuscript:</p> <ol style="list-style-type: none"><li>1. <b>Lack of details on the statistical analysis:</b><ul style="list-style-type: none"><li>○ The manuscript states that the data were subjected to statistical analysis using ANOVA, but does not provide any specifics on the statistical methods, the significance levels used, or the interpretation of the results.</li><li>○ Including more details on the statistical analysis, such as the model assumptions, the test statistics, and the p-values, would strengthen the rigor of the study.</li></ul></li><li>2. <b>Absence of effect size reporting:</b><ul style="list-style-type: none"><li>○ While the manuscript reports the mean values for the different treatments, it does not provide any information on the magnitude of the differences or the effect sizes.</li><li>○ Reporting effect sizes, such as Cohen's d or partial eta-squared, would help readers better understand the practical significance of the findings.</li></ul></li><li>3. <b>Lack of consideration for multiple comparisons:</b><ul style="list-style-type: none"><li>○ With a large number of treatments (7 nutrient management practices), the manuscript should have addressed the issue of multiple comparisons and the potential for inflated Type I error rates.</li><li>○ Employing appropriate statistical corrections, such as the Bonferroni or Holm-Sidak methods, would help control the family-wise error rate.</li></ul></li><li>4. <b>Insufficient information on experimental design:</b><ul style="list-style-type: none"><li>○ The manuscript mentions the use of a randomized block design but does not provide details on the number of replications, the plot sizes, or the randomization procedures.</li><li>○ Providing more comprehensive information on the experimental design would allow for a better evaluation of the statistical validity of the study.</li></ul></li><li>5. <b>Absence of assumptions testing:</b><ul style="list-style-type: none"><li>○ The manuscript does not report any checks on the assumptions of the ANOVA, such as normality, homogeneity of variance, or independence of errors.</li><li>○ Verifying the assumptions and addressing any violations would strengthen the statistical inferences drawn from the analysis.</li></ul></li><li>6. <b>Lack of power analysis and sample size justification:</b><ul style="list-style-type: none"><li>○ The manuscript does not provide any information on the a priori power analysis or the rationale for the chosen sample size.</li><li>○ Reporting these details would help readers assess the statistical power of the study and the reliability of the conclusions.</li></ul></li><li>7. <b>Limited reporting of uncertainty and variability:</b><ul style="list-style-type: none"><li>○ The manuscript primarily focuses on reporting the mean values without providing measures of variability, such as standard deviations or standard errors.</li><li>○ Incorporating measures of uncertainty and variability would allow for a more comprehensive interpretation of the results.</li></ul></li></ol> <p>Addressing these statistical problems and defects would significantly improve the rigour and transparency of the manuscript, enhancing the credibility and interpretability of the findings.</p> <p>Based on the information provided in the materials and methods section, there are a few potential areas that could be improved or expanded upon to strengthen the study:</p> <ol style="list-style-type: none"><li>1. <b>Justification for the SPAD-based nitrogen management approach:</b><ul style="list-style-type: none"><li>○ The manuscript mentions using a critical SPAD threshold value of 46.1 but does not provide a clear rationale for selecting this specific value. More details on how this threshold was determined or validated would be helpful.</li><li>○ Explaining the agronomic basis and prior research supporting the use of SPAD-based nitrogen management in maize would provide stronger justification for this approach.</li></ul></li></ol>	
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	<p><b>2. Characterization of the organic nutrient sources:</b></p> <ul style="list-style-type: none"><li>○ While the use of vermicompost as an organic nitrogen source is mentioned, there is limited information on its composition, application rates, and how it was integrated with the inorganic fertilizers.</li><li>○ Providing more details on the properties and nutrient content of the vermicompost, as well as how the organic and inorganic sources were balanced, would strengthen the understanding of nutrient management practices.</li></ul> <p><b>3. Evaluation of pest pressure and management efficacy:</b></p> <ul style="list-style-type: none"><li>○ The manuscript mentions the use of the insecticide Chlorpyrifos 20 EC but does not provide details on the observed pest pressure, the rationale for the application rates and timing, or an assessment of the pest management efficacy.</li><li>○ Incorporating information on pest monitoring, thresholds, and the impact of the insecticide application on pest control would help contextualize this aspect of the integrated management approach.</li></ul> <p><b>4. Limitations of the experimental design:</b></p> <ul style="list-style-type: none"><li>○ While the use of a randomized block design is mentioned, there is limited information on the plot sizes, number of replications, and other relevant design parameters.</li><li>○ Acknowledging any potential limitations of the experimental design, such as the number of treatments or the size of the experimental area, would help readers better interpret the results.</li></ul> <p><b>5. Broader context and implications:</b></p> <ul style="list-style-type: none"><li>○ The manuscript could be strengthened by providing more context on the importance of sustainable maize production in the region and how the findings of this study fit into the broader body of research on integrated nutrient and pest management in maize.</li><li>○ Discussing the practical implications of the results, such as the potential for adoption by farmers or the need for further research, would enhance the relevance and impact of the study.</li></ul> <p>Addressing these areas would help to provide a more comprehensive and robust scientific foundation for the study, improving the overall quality and impact of the manuscript.</p> <p>Based on the information provided in the materials and methods section, there are a few potential limitations to the conclusions of this study:</p> <p><b>1. Lack of evaluation of irrigation and weed management practices:</b></p> <ul style="list-style-type: none"><li>○ The manuscript acknowledges that the study did not incorporate irrigation and weed management practices, which could also have a significant impact on maize production.</li><li>○ Incorporating these additional management factors in future experiments would provide a more comprehensive understanding of the sustainable input management practices for maize.</li></ul> <p><b>2. The short duration of the study:</b></p> <ul style="list-style-type: none"><li>○ The experiment was conducted over two consecutive rabi (winter) seasons, which may not be sufficient to evaluate the long-term sustainability of the input management practices fully.</li><li>○ Extending the study over a longer time period, potentially including multiple growing seasons, would help to validate the consistency and robustness of the findings.</li></ul> <p><b>3. Lack of economic analysis:</b></p> <ul style="list-style-type: none"><li>○ The manuscript does not provide any information on the economic implications of the different input management practices, such as the cost-benefit analysis or the potential for adoption by farmers.</li><li>○ Incorporating an economic evaluation would help to assess the practical feasibility and scalability of the recommended practices.</li></ul> <p><b>4. Limited geographic representation:</b></p> <ul style="list-style-type: none"><li>○ The study was conducted at a single research farm in Bihar, India, which may</li></ul>	
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	<p>limit the broader applicability of the findings to other maize-growing regions with different agro-climatic conditions.</p> <ul style="list-style-type: none"> <li>○ Replicating the study in multiple locations or across a wider geographic area would strengthen the generalizability of the conclusions.</li> </ul> <p>5. Absence of soil and environmental data:</p> <ul style="list-style-type: none"> <li>○ The manuscript does not provide any information on the initial soil characteristics, nutrient status, or environmental conditions (e.g., rainfall, temperature) at the experimental site.</li> <li>○ Incorporating these contextual factors would help to understand better the underlying mechanisms and interactions that influenced the crop responses to the input management practices.</li> </ul> <p>Addressing these limitations in future research would strengthen the conclusions and provide a more comprehensive understanding of the sustainable input management strategies for maize production in the region.</p> <p>Based on the evaluation of the manuscript, I would recommend a score of 7-8, indicating that the manuscript requires major revisions before it can be considered for publication. The study has several strengths, including:</p> <ol style="list-style-type: none"> <li>1. A well-designed experiment using a randomized block design with multiple treatments and replications.</li> <li>2. Measurement of relevant growth parameters, yield components, and total biomass production.</li> <li>3. Identification of the SPAD-based nitrogen management with insecticide application (N6) as the most effective treatment for maximizing maize productivity.</li> </ol> <p>However, several areas need to be addressed through major revisions:</p> <ol style="list-style-type: none"> <li>1. Lack of sufficient details on the SPAD-based nitrogen management approach, organic nutrient sources, and pest management practices.</li> <li>2. Unclear if the experiment was conducted over two seasons or was a single experiment was repeated.</li> <li>3. Limited justification for the specific treatments chosen and their relevance to sustainable maize production.</li> <li>4. Absence of an economic analysis and the potential for adoption by farmers.</li> <li>5. The short duration of the study and limited geographic representation.</li> </ol> <p>Addressing these issues through major revisions would significantly strengthen the manuscript and its contribution to the field of sustainable maize production. The core experimental design and findings are promising, but the manuscript requires substantial improvements in the materials and methods, discussion, and conclusion sections to be considered for publication.</p>	
<p><b>Minor</b> REVISION comments</p> <p>1. Is language/English quality of the article suitable for scholarly communications?</p>	<p>It needs severe revision and correction.</p>	
<p><b>Optional/General</b> comments</p>	<p>It needs correction and revision in terms of statistics and English grammar.</p>	

**PART 2:**

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<p>Are there ethical issues in this manuscript?</p>	<p>(If yes, Kindly please write down the ethical issues here in details)</p>	

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**Reviewer Details:**

Name:	<b>Sayed Mohammad Reza Khoshroo</b>
Department, University & Country	<b>Islamic Azad University, Iran</b>