

REVIEWER'S REPORT

Manuscript No.: IJAR- 58607

Title: *Effect of intercropping sesame (*Sesamum indicum* L.) and cowpea (*Vigna unguiculata* L.) on their agronomic performance under rainfed conditions in Bambey, Senegal.*

Recommendation:

Accept as it is

Accept after moderate revision.....

Accept after major revision

Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality		✓		
Techn. Quality		✓		
Clarity			✓	
Significance			✓	

Reviewer Name: **ANAPANA GOPAL**

Reviewer's Comment for Publication.

General Comments

This manuscript evaluates the agronomic performance of sesame and cowpea under sole cropping and intercropping systems under rainfed conditions in Bambey, Senegal. The study addresses an important issue in sustainable agriculture, particularly in regions facing land scarcity and climate variability. The use of intercropping performance indices such as Land Equivalent Ratio (LER), Land Equivalent Coefficient (LEC), Aggressivity, Competitive Ratio (CR), and Percentage Land Saved provides valuable information on crop compatibility and land-use efficiency.

The experimental design is generally appropriate, and the results suggest that sesame-cowpea intercropping can improve land-use efficiency without significantly reducing individual crop yields. However, the manuscript requires substantial revisions to strengthen the experimental methodology, statistical analysis, interpretation of results, discussion, and presentation before it can be considered for publication.

Minor Comments

1. Novelty should be better emphasized

The authors state that sesame-cowpea intercropping has not previously been evaluated in Senegal, but the Introduction does not sufficiently distinguish this study from previous intercropping research conducted elsewhere.

The manuscript should clearly explain:

- the scientific novelty of this work;
- why this crop combination is important for Senegalese farming systems;
- how the findings advance current knowledge on cereal-legume and oilseed-legume intercropping.

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2. Statistical methodology requires improvement

The manuscript reports ANOVA and LSD tests but omits important statistical information.

The authors should report:

- ANOVA assumptions (normality and homogeneity of variance);
- F-values and degrees of freedom;
- exact *P*-values;
- confidence intervals;
- effect sizes.

Because the experiment spans two growing seasons, a combined two-way ANOVA (Year × Cropping System) should also be considered to evaluate year effects and interactions.

3. Experimental design requires further clarification

Several methodological details should be added:

- justification for only three replications;
- method of randomization;
- plot border management;
- harvesting area used for yield estimation;
- whether border rows were excluded;
- weed, pest, and disease incidence during the experiment.

These details are essential for reproducibility.

4. Interpretation of yield results needs refinement

Although no statistically significant differences in sesame or cowpea yield were observed between monocropping and intercropping, the manuscript concludes that intercropping is highly beneficial.

This conclusion should be moderated because the principal advantage appears to arise from **land-use efficiency (LER = 1.94)** rather than yield increases of individual crops. The distinction between biological efficiency and yield advantage should be explained more clearly.

5. Biological indices require deeper interpretation

The manuscript reports LER, LEC, Aggressivity, and Competitive Ratio, but their biological significance is only briefly discussed.

The Discussion should explain:

- why cowpea was more aggressive than sesame;
- mechanisms of complementarity between the two species;
- effects of canopy architecture and root interactions;
- implications for resource use efficiency under rainfed conditions.

6. Economic analysis is absent

Since intercropping is proposed as a strategy for smallholder farmers, the study would be strengthened by including:

- gross income,
- net returns,
- benefit–cost ratio,
- labour requirements,

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- economic land equivalent ratio.

If such analyses were not performed, this limitation should be acknowledged.

7. Discussion should incorporate more recent literature

Most references are relatively old.

The Discussion should compare the findings with more recent studies (2020–2025) on sesame-based intercropping systems from Africa and Asia to better position the results within the current literature.

8. Study limitations should be acknowledged

The manuscript does not discuss important limitations, including:

- single experimental location;
- only two cropping seasons;
- one sesame variety and one cowpea variety;
- rainfed conditions only;
- absence of soil nutrient dynamics.

These limitations should be acknowledged in the Conclusion.

Specific Comments

Abstract

The abstract is clear and concise.

However, it should include:

- major quantitative results;
- statistical significance where appropriate;
- practical implications;
- a brief statement of the study's novelty.

Introduction

The Introduction adequately describes the importance of crop diversification.

However:

- several paragraphs are lengthy;
- the research gap should be more explicitly stated;
- recent literature on intercropping should be incorporated.

Materials and Methods

The methodology is generally adequate but requires additional information regarding:

- seed quality and germination rate;
- rainfall distribution during the growing season;
- pest and disease management;
- sampling procedure for growth measurements;
- justification for fertilizer rates.

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Results

The Results are clearly presented.

However:

- avoid repeating values already shown in tables;
- include standard errors or confidence intervals in figures;
- provide sample size (n) in tables;
- indicate whether yearly data met assumptions for pooled analysis.

Figures and Tables

The tables are informative.

However:

- Figure resolution should be improved.
- Figure captions should be more descriptive.
- Units should be consistently formatted throughout.
- Statistical significance indicators should be explained uniformly.

Discussion

The Discussion should move beyond describing results and provide stronger biological interpretation.

Additional discussion should include:

- nitrogen fixation by cowpea;
- below-ground resource partitioning;
- water-use efficiency;
- implications under climate variability;
- comparison with similar intercropping studies.

Conclusion

The Conclusion appropriately summarizes the findings but should also include:

- limitations of the study;
- recommendations for future research;
- practical implications for extension services and farmers.

References

The reference list includes relevant foundational literature but requires updating.

The authors should incorporate more recent peer-reviewed publications and ensure consistent formatting according to the journal style. Some references also contain formatting inconsistencies that should be corrected.

Language and Presentation

The manuscript is understandable but requires careful English language editing.

Examples include:

- grammatical errors;
- inconsistent terminology (e.g., "intercrop" vs. "intercropping");
- inconsistent capitalization;
- formatting inconsistencies in tables and references;
- typographical errors.

Professional language editing is recommended.

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Strengths

- Relevant topic for sustainable agriculture.
- Well-designed field experiment conducted over two growing seasons.
- Appropriate use of biological intercropping indices (LER, LEC, CR, Aggressivity).
- Practical implications for improving land-use efficiency.
- Clear experimental objective.
- Results have potential relevance for smallholder farming systems in semi-arid regions.

Weaknesses

- Novelty requires stronger justification.
- Statistical reporting is incomplete.
- Biological mechanisms are insufficiently discussed.
- No economic evaluation.
- Limited discussion of study limitations.
- Literature review needs updating.
- English language and formatting require improvement.

Final Recommendation

This manuscript addresses an important topic in sustainable cropping systems and provides useful evidence that sesame-cowpea intercropping can improve land-use efficiency under rainfed conditions in Senegal. The experimental work is valuable, and the use of intercropping indices strengthens the study. However, important revisions are needed to improve methodological transparency, statistical reporting, biological interpretation, discussion, and overall presentation. Addressing these issues will significantly enhance the scientific quality and impact of the manuscript.

Recommendation: Minor Revision.