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REVIEWER'S REPORT

Manuscript No.: IJAR-55901

Title: Influence of Cassia sieberiana DC (Sieber\'s cassia, Fabaceae) on certain physical and chemical properties of soil in Fandene, Senegal

Recommendation:

Accept as it is .....

Accept after minor revision.....

Accept after major revision .....

Do not accept (*Reasons below*) .....

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

Reviewer Name: Dr Thirunahari Ugandhar

Detailed Reviewer's Report

General Assessment

The manuscript investigates the influence of *Cassia sieberiana* DC on selected physicochemical properties of soils in the Fandène terroir, Senegal. The topic is relevant and timely, particularly in the context of soil degradation, climate change, and sustainable agroforestry practices in arid and semi-arid regions. The study provides useful empirical data on soil texture, pH, electrical conductivity, organic carbon, organic matter, and nitrogen under different canopy radii, diameter classes, and soil depths.

Overall, the manuscript has scientific merit and contributes to the limited literature on the soil-improving role of *Cassia sieberiana*, a species with recognized ecological and socio-economic importance. However, several aspects related to clarity, structure, language, statistical presentation, and interpretation of results require improvement before the manuscript can be considered for publication.

Major Comments

1. **Originality and Relevance**

The research question is clearly defined and addresses an important gap, as studies on the soil fertility effects of *Cassia sieberiana* are indeed scarce compared to other agroforestry species.

The focus on diameter classes, crown radius, and soil depth is scientifically sound and well justified.

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The manuscript would benefit from a clearer statement of novelty in the Introduction, explicitly distinguishing this work from previous studies on other leguminous or savannah tree species.

2. **Abstract**

The abstract is informative but overly long and contains some repetition.

It should be condensed and structured more clearly to include: background, objective, methods, key results (with the most important quantitative trends), and conclusions.

Some methodological details (e.g., exact sampling design) can be reduced to improve readability.

3. **Introduction**

The Introduction is rich in botanical, ecological, and ethnopharmacological information on *Cassia sieberiana*, which demonstrates strong background knowledge.

However, the section is too long and could be streamlined. Parts related to medicinal uses, phytochemistry, and ethnobotany could be shortened and better linked to soil–plant interactions.

Citations should be checked for consistency and formatting, and some references appear to be cited without proper punctuation or spacing.

4. **Materials and Methods**

The study area is well described, and the sampling strategy is generally clear.

The experimental design (diameter classes, crown radii, depths, number of samples) is appropriate.

However, clarification is needed on:

Whether the sampling points were randomly or systematically distributed within each crown radius.

The justification for choosing only three trees per diameter class.

Statistical analysis should be described more precisely, including:

- **Assumptions of ANOVA (normality, homogeneity of variance).**
- **Exact model used (fixed vs random factors).**
- **Significance level applied.**

5. **Results**

Results are presented in a logical order, distinguishing between physical and chemical soil properties.

The findings on higher organic carbon and organic matter at 2/3 crown radius and in class C2 are interesting and relevant.

However: Tables should be clearly numbered, titled, and referenced consistently in the text.

Some results are repeated in both text and tables and could be summarized more concisely.

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- **The presentation of interaction effects would benefit from figures or graphs to improve clarity.**

6. **Discussion**

The Discussion adequately compares findings with previous studies and provides reasonable ecological explanations.

The interpretation of higher nitrogen levels outside the canopy is particularly interesting but requires deeper discussion, possibly supported by microbial or land-use explanations.

Some statements are speculative and should be supported with references or toned down.

The discussion could be improved by explicitly linking the results to agroforestry management and soil restoration strategies.

7. **Conclusion and Recommendations**

The conclusion summarizes the main findings well and is consistent with the objectives.

The recommendations are practical and relevant for land management and future research.

However, the reference to "hypotheses 1, 2, 3, and 4" should be clarified earlier in the manuscript or avoided if hypotheses were not explicitly stated in the Introduction.

Minor Comments

- **Language and grammar need revision throughout the manuscript, particularly for:**

  Sentence structure,

  Verb tenses,

  Agreement between subject and verb.
- **Some typographical errors and formatting inconsistencies are present (e.g., spacing between words, reference numbering).**
- **Units (e.g., %, µS/cm) should be consistently formatted.**
- **Scientific names should be italicised consistently (*Cassia sieberiana* DC).**
- **Ensure uniform use of decimal points and percentages.**

Overall Recommendation

Major Revision

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The manuscript addresses an important research topic and presents valuable data; however, substantial revisions are required to enhance clarity, structure, language quality, and methodological transparency. With careful revision, the paper has good potential for publication in a journal focusing on soil science, agroforestry, or environmental management