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Paper: “Quantitative Mapping Using a GIS/RUSLE Approach of Water Erosion of Soils and the Resulting Carbon Losses: The Case of the Fatick Region (Senegal)”

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Peer review:

Reviewer 1: Gabriel Sosa-Pérez
INIFAP, Mexico

Reviewer 2: Sosthenes Kwadzo Kufogbe
Wisconsin International University College, Ghana

Reviewer 3: Blinded

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Manuscript Title: Quantitative mapping using a GIS/RUSLE approach of water erosion of soils and the resulting carbon losses : the case of the Fatick region (Senegal)	
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Evaluation Criteria:

Please give each evaluation item a numeric rating on a 5-point scale, along with a thorough explanation for each point rating.

Questions	Rating Result
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	[Poor] 1-5 [Excellent]
1. The title is clear, and it is adequate for the content of the article.	5
<i>The title is clear and adequate</i>	
2. The abstract presents objectives, methods, and results.	5
<i>The abstract identified the theoretical basis of the research and the related empirical issues. The methods are relevant and provide clear conclusions and relevant recommendations</i>	
3. There are a few grammatical errors and spelling mistakes in this article.	3
<i>The entire text formatting must be Times New Roman. This applies especially to the discussion of Fig. 7 and Fig. 9</i>	
4. The study methods are explained clearly.	5
<i>The methodology is excellent. The authors demonstrated clear understanding of the USLE as it has evolved into RSULE and its variants which take into account the modern versions LEAM and PAP/CAR. The integration of GIS into the analysis makes the paper conform to current research as it recognizes the global and local carbon context of mixed ecosystem agricultural variants in West Africa which is widely recognized as a weakness in the original USLE model.</i>	
5. The results are clear and do not contain errors.	4
<i>The results address the key elements in the USLE model.</i>	
6. The conclusions or summary are accurate and supported by the content	5
The conclusions/summaries are well presented in clear text and language using relevant Figures and Tables deriving from the multi-layered GIS analysis.	
7. The references are comprehensive and appropriate.	3
<i>Authors should edit the entire text for several missing References in the respective sections/pages some of which are listed below:</i> • (Maamar-Kouadri K., et al., 2016). • (Gerard et al., 2020)	

- Wischmeir and Smith (1978): (Note also its undue repetition in the respective paragraphs where it is used.
 - Nguyen equation (1996): The reference to the Nguyen equation needs to be vited. (Williams, 1995)
 - EPIC model: There is need for adequate citation here as well
 - Roose (1989-1990),
 - Byizigiro et al. (2020)
 - (Briss and Brahim, 2018).
-
- Girard M-C, Walter C., Rémy JC, Berthelin J., and Morel JL, 2011. Soils and the environment. Co-published by ADEME (7048) / DUNOD, Paris, 2011, 881 p. (Check and edit date.
 - Roose Éric and De Noni Georges, 2004. Research on water erosion in Africa : review and perspectives. Drought 15(1) : 121-129.
 - Tables/Fig: Edit and specify the date appropriately
 - Figure 4 : Methodological flowchart of the applied RUSLE model : Check and edit : This Flow chart has no entries
 - Pagination : Edit and provide pagination for the entire paper.

Overall Recommendation (mark an X with your recommendation) :

Accepted, no revision needed	
Accepted, minor revision needed	X
Return for major revision and resubmission	
Reject	

Comments and Suggestions to the Author(s):

This is an excellent paper which draws on earlier attempts by integrating relevant USLE factors into GIS. As with other researches, the paper addresses the specific agro-ecological contexts in the study area of Fatick region, Senegal in West Africa. The paper therefore makes a significant contribution to understanding and analysis of the USLE mode which are largely the small farming mixed ecological contexts which are not easily accounted for in the original USLE model.

Comments and Suggestions to the Editors Only:

Reviewer A:
Recommendation: Resubmit for Review

The TITLE is clear and it is adequate to the content of the article.

The title is clear and appropriate.

The ABSTRACT clearly presents objectives, methods, results, and conclusions.

Yes, the abstract includes all the necessary components

There are a few grammatical errors and spelling mistakes in this article.

The manuscript needs to be revised to address some writing and formatting issues. While grammatical errors are minor, the vocabulary utilized is somewhat simplistic for a scientific paper. Furthermore, the authors must ensure strict consistency in the use of decimal separators (points vs. commas) across the entire text, and verify that all labels, legends, and annotations in the figures are correctly written in English

The study METHODS are explained clearly.

The methods are not properly described. A significant amount of information is missing regarding the use and origin of the values utilized in the equations. Furthermore, the equations are not adequately presented, both in terms of formatting and in the explanation of their application.

Spatial Resolution: It is necessary to specify the spatial resolution (pixel size) utilized in the maps.

Factor R: When modeling erosion, it is essential to consider that low-intensity rainfall events outside the wet season do not contribute to soil degradation. For this reason, the erosivity factor is conventionally adjusted using a Julian day percentage that delineates the period of higher erosive precipitation. It must be specified whether the R-factor was calibrated to account for this seasonality, as omitting this adjustment can lead to an overestimation of erosion potential.

Factor L: It is not clear how the slope length factor (L-factor) was derived. I suggest organizing and numbering the equations to follow the step-by-step calculation process.

Factor C: The authors should clarify whether the C-factor values were also obtained from the reference provided, or if only the vegetation types were extracted.

Factor P: This is a critical point; therefore, it is essential to clarify whether data on erosion control practices are simply unavailable or whether these practices are not implemented. There is

a fundamental difference between a lack of data and the confirmed absence of such practices. If conservation measures are actively being implemented but omitted due to a lack of information, the model's outputs could be significantly compromised, leading to erroneous conclusions.

The results are clear and do not contain errors.

While the results are clear, the explanation is deficient. The formatting of the text in this section is inconsistent, and the text simply duplicates the information available in the tables. The authors should use the text to highlight key trends and relationships rather than restating every numerical value

The CONCLUSION or summary is accurate and supported by the content.

Although the conclusions are supported by the data, the contribution and novel findings of this study regarding: 1) the implications, limitations, or new recommendations for the application of the RUSLE framework; and 2) the specific erosion rates within the watershed, are highly limited and offer low scientific relevance. Given the watershed's topography, it was entirely expected that the majority of the area would exhibit low erosion rates. By concluding that 99% of the watershed presents very low erosion—under 5 tons per hectare per year—there is remarkably little margin left to discuss or propose meaningful management actions that would give this study broader significance or academic impact

The list of REFERENCES is comprehensive and appropriate.

The formatting of the reference list is inconsistent. Please review and ensure all references strictly follow the journal's citation style guidelines

Please rate the TITLE of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the ABSTRACT of this paper.

[Poor] 1-5 [Excellent]

3

Please rate the LANGUAGE of this paper.

[Poor] 1-5 [Excellent]

2

Please rate the METHODS of this paper.

[Poor] 1-5 [Excellent]

2

Please rate the RESULTS of this paper.

[Poor] 1-5 [Excellent]

2

Please rate the CONCLUSION of this paper.

[Poor] 1-5 [Excellent]

2

Please rate the REFERENCES of this paper.

[Poor] 1-5 [Excellent]

2

Overall Recommendation!!!

Return for major revision and resubmission

Comments and Suggestions to the Author(s):

Please refer to the detailed comments provided above and those annotated directly within the manuscript file