

Review of: "Hydrogeochemical Appraisal of Groundwater Quality and Its Suitability for Drinking and Irrigation Purposes in the West Central Senegal"

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Potential competing interests: No potential competing interests to declare.

The present paper addresses the issue of groundwater pollution in West Central Senegal, caused by the excessive use of fertilizers and pesticides in agriculture. The objective of the study was to determine the extent to which agricultural activities have led to the degradation of groundwater quality in the study area. However, the methods used to answer this question are a repetition to what have already done. Thus, no novelty is presented.

The major strengths of the article are that the study design is appropriate to answer the aim, and the methods used to assess groundwater quality are diverse and well-chosen. However, the study may have limited impact in the field, as it does not contribute new findings to what was already known on this topic. All of the methods used in the study have been previously employed in other studies, indicating that the same approach has been used repeatedly.

Major points:

1. The present manuscript does not provide any previous studies from which a research gap could be extracted, regarding the assessment of groundwater quality and the most suitable method used for this purpose.
2. Another objective, which was not mentioned in the introduction, is the evaluation of the mechanisms that control groundwater chemistry and it should be mentioned.
3. The methods used to assess groundwater quality are not mentioned in the introduction, and it is important to state and justify their use.
4. The introduction does not provide an outline of the existing solutions to the problem, which should be inspired by the literature review. Additionally, it does not explain why the current solutions are inadequate. Therefore, no new solution to the problem is presented.
5. In the introduction section, I suggest that you state a hypothesis about the degree of groundwater pollution in the study area, such as the possibility of high contamination of the groundwater in the study area due to agricultural pollutants.
6. The methods used to evaluate the mechanisms controlling groundwater chemistry, including Gibbs plot, Scatter plot of Na versus Cl, Scatter plot between $(Ca^{2+} + Mg^{2+} - SO_4^{2-} - HCO_3^-)$ versus $(Na^+ + K^+) - Cl$, and Piper plot, were not mentioned in the methodology section.
7. The authors did not cite any publications to ensure that the methods used are valid and reliable.
8. You should add the raw data which is an essential component of any study as it provides the foundation for analysis

and interpretation; without it, the study cannot be replicated or validated by other researchers, which can lead to a lack of transparency and credibility in the scientific community.

9. In the discussion section, it is important to compare the results of the study with those of other relevant studies. Additionally, the entire set of results should be compared and contrasted with each other to identify areas of agreement and disagreement. The implications of the study should be clearly declared in this section, as it is the place to explain the significance of the findings and their potential impact on the field.
10. If applicable, include the limitations in the conclusion section.

Minor Points

1. The English language of the manuscript needs to be improved.
2. Page 4: In Figure 2, the months are written in French instead of English. Therefore, the language should be changed.
3. There is repetition in the following passage on page 11: "Chemical quality of water, especially groundwater, is an important factor that determines its use in various human activities such as human consumption, agriculture, industry ... Therefore, the assessment of its chemical composition can decide the type of use."
4. How reliable is the classification that you used based on the electrical conductivity on page 11?
5. On page 12, please change the section title "Groundwater suitability for drinking" because the previous section has already covered the same topic.
6. On page 12, the sentence "Furthermore, the water quality index (WQI), total hardness (TH) and total dissolved solids (TDS) which are others important water quality parameter were also used in this study" is grammatically incorrect, please reword it.
7. What is meant by "congenial diseases" on page 12?
8. On page 18 and 19, please ensure that the lower and upper cases of the ionic elements are correct.
9. On page 20, please include the name of the diagram, "Wilcox diagram," in the caption of Figure 7.
10. Please ensure that all decimal numbers are separated by points instead of commas.