Review Form 1.7

Journal Name:	**Journal of Engineering Research and Reports**
Manuscript Number:	**Ms_JERR_108553**
Title of the Manuscript:	**Modelling Groundwater Quality of Aba in Abia State Using Principal Component Analysis and Multiple Linear Regression**
Type of the Article	**Original Research Article**

Review Form 1.7

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)*
Compulsory REVISION comments **1. Is the manuscript important for scientific community?** (Please write few sentences on this manuscript) **2. Is the title of the article suitable?** (If not please suggest an alternative title) **3. Is the abstract of the article comprehensive?** **4. Are subsections and structure of the manuscript appropriate?** **5. Do you think the manuscript is scientifically correct?** **6. Are the references sufficient and recent? If you have suggestion of additional references, please mention in the review form.** **(Apart from above mentioned 6 points, reviewers are free to provide additional suggestions/comments)**	**Yes** **Yes** **Yes** **Yes** **Yes** **Additional references are suggested as remedial measures to be taken for the purification of ground water and refinement of the present manuscript.** To Date: 05/11/2023 Editor Journal of Engineering Research and Reports (JERR) **Reviewer's comments and suggestions for Ms JERR 108553** The present manuscript titled "**Modelling Groundwater Quality of Aba in Abia State Using Principal Component Analysis and Multiple Linear Regression"** is aimed to investigate the modelling of groundwater quality of Aba in Abia state. Authors have studied pH, EC, Total Hardness, BOD_5, COD, Pb, Cd, Cr, NH_3, TDS, SO_4, NO_3 and PO_4. This work reported water quality index can be estimated using the WQI model with pH, PO_4, COD, SO_4 and Pb in the dry season. Similarly, water quality index can be estimated using the WQI model with Turbidity, PO_4, NO_3, COD, SO_4 and Pb in in the rainy season. This investigation reported the one-way ANOVA for the parameters in the dry season with $p = 0.000 < 0.05$ indicated that leachate had a large effect on groundwater quality. This work also highted that during the rainy season, one-way ANOVA result with $p = 0.000 < 0.05$ asserted that leachate had a large effect on groundwater quality. This manuscript is written methodically and logically. Nonetheless, some points and errors should be rectified before the publication of this paper. The reviewer therefore recommends the publication of this work after **Major revision** according to the following comments. **Comment 1:** There are some grammatical errors observed throughout the manuscript. Please correct it grammatically in the revised manuscript. **Comment 2**: Please refer abstract section. The formula of ammonia is written as NH3. Please correct it as NH_3. Use subscript for the valency throughout the manuscript. **Comment 3**: Why did author put the collected samples in an ice bag before transferring to the laboratory? **Comment 4**: What are the WHO parameters for pH, Electrical Conductivity, TDS, Turbidity, PO_4, NO_3, COD, SO_4, Total Hardness, BOD_5 and Pb for drinking water? Please include in reference list. **Comment 5:** Please refer Figure 5: Scree plot for rainy season Eigenvalues using PCA. Why there	

	is decrease in Eigenvalues with increase in component number for rainy season? **Comment 6:** Please refer Table 8: Observed vs Predicted WQI using MLR for dry season. Observed WQI and VF1 Predicted WQI values are exactly same without any variation or error. How is it possible? **Comment 7** Please refer Table 10: Observed vs Predicted WQI using MLR for rainy season. Observed WQI and VF1 Predicted WQI values for rainy season are exactly same without any deviation or error? How? **Comment 8**: Please refer Table 11. P -value for Pb is mentioned as 2.26266E-35. Please check it. **Comment 9**: Why are models accepted for extracted factors VF1 for dry and rainy seasons? Please discuss it in detail. **Comment 10**: Why are models rejected for extracted factors VF2 and VF3 for dry and rainy seasons? Please discuss it in detail. **Comment 11**: Figure 6: Visual validation of WQI model for dry season. The graph is zigzag in nature. Why? Clarify it. **Comment 12.** Figure 7: Visual validation of WQI model for rainy season. The graph is also zigzag in nature. Why? Clarify it. **Comment 13:** What is innovative and novelty of this work? Please discuss it. **Comment 14**: What is the further scope of research in this field? Please incorporate it in revised manuscript. **Comment 15:** Experimental data reported p = 0.000 < .05. The consequence is to reject H_0 and accept H_1. Why? What does it indicate? **Comment 16:** In this manuscript, author has analysed various parameters of ground water of Aba in Abia state such as pH, EC, Total Hardness, BOD_5, COD, Pb, Cd, Cr, NH_3, TDS, SO_4, NO_3 and PO_4. Author reported that these parameters could contribute to the deterioration of water quality in the future. However, author has not suggested any remedial measures for the future for the purification of contaminated ground water. In view of this, please suggest different methods for the treatment of ground water of Aba in Abia state. This contaminated ground water can be purified by using conventional methods such as chlorination, potassium permanganate, homogenous catalysis and advanced oxidation processes using UV/nanomaterials. Please read these published manuscripts and incorporate the changes in revised manuscripts. Oxidative transformation of antiretroviral drug zidovudine during water treatment with permanganate: reaction kinetics and pathways, Desalination and Water Treatment 1 (DOI: 10.1080/19443994.2016.1149110), 1-12 Mechanistic and spectroscopic investigations of Ru3+-catalyzed oxidative degradation of azidothymidine by heptavalent manganese at environmentally relevant pH, Desalination and Water treatment 1 (DOI: 10.1080/19443994.2016.1187090), 1-14 Palladium (II)-catalyzed oxidation kinetics of azidothymidine by heptavalent manganese during water treatment: kinetics, mechanism, and degradation, Desalination and Water treatment 144, 211-223 Photocatalytic degradation of pharmaceutical drug zidovudine by undoped and 5% barium doped zinc oxide nanoparticles during water treatment: Synthesis and characterisation, International Journal of Applied Pharmaceutics, 2019.	

	5% Barium doped zinc oxide semiconductor nanoparticles for the photocatalytic degradation of Linezolid: synthesis and characterization, 2019, SN Applied Sciences 1 (1), 103. Photocatalytic degradation of zidovudine by 0.8% ruthenium doped titanium dioxide nanoparticles during water treatment: synthesis, characterisation, kinetics and mechanism, Desalination and Water Treatment 182 Mechanistic insight into photocatalytic degradation of antibiotic cefadroxil by 5 % barium/zinc oxide nanocomposite during water treatment, Emergent Materials, https://doi.org/10.1007/s42247-021-00243 **Comment 17**: There are some minor errors found in list of references. Page numbers need to be written with uniform style. The full names for all journals need to written properly in list of references. It is advised that please follow the same style of references throughout. Author needs to follow the guidelines of the journal and uniformity. Author can download recently published papers to follow it properly. So, it is advised that please check all the references properly and rectify all the mistakes such as author's name, punctuations (, .etc), year, volume, journal name abbreviations etc. I am sure that these suggestions will certainly improve the present manuscript. Thanks and regards Reviewer	
Minor REVISION comments **1. Is language/English quality of the article suitable for scholarly communications?**	**Yes**	
Optional/General comments	**No**	

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)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

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