## REVIEWER'S REPORT

Manuscript No.:    IJAR-54181

**Title:** MAPPING OF POLLUTION-SENSITIVE AREAS BY THE PAPRI METHOD, VERIFIED BY NITRATE CONCENTRATIONS IN THE BAYA WATERSHED (EASTERN IVORY COAST),

**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

**Date:** 4th Oct 2025

*Detailed Reviewer's Report*

### 1. Title and Abstract

**Strengths:**
The title is informative and reflects the core methodology (PaPRI) and validation (nitrate concentrations). The abstract clearly summarises the objectives, methods, key findings, and implications.

**Suggestions:**

The abstract can be made more concise by removing some repetitive phrases (e.g., "with a view to taking the necessary protective measures" appears multiple times).

It would be useful to briefly define "PaPRI" in the abstract itself (Protection–Infiltration–Reservoir) for clarity to readers unfamiliar with the method.

Indicate the specific data sources or period of study (if available) for better context.

### 2. Introduction

Strengths:
The introduction effectively highlights the global concern of groundwater pollution and provides relevant references linking local pollution issues to anthropogenic activities in Côte d'Ivoire.

Suggestions:

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The introduction is overly long and contains repetitive explanations about pollution causes. Condense it to improve readability.

A clearer articulation of the research gap is needed. For example: Why was PaPRI chosen over other methods such as DRASTIC or GOD?

Ensure consistent formatting of references and remove unnecessary capitalization (e.g., "In the Gontougo region…" could begin a new paragraph with contextual focus).

### 3. Materials and Methods

Strengths:
The study area is well described with clear coordinates and relevant hydrogeological details. The multi-criteria GIS approach is appropriate for pollution vulnerability mapping.
 **Suggestions:**

Provide clearer justification for the selection of weighting coefficients (0.71, 0.22, 0.06). Mention the reasoning or expert input behind the Saaty pair comparison method.

Improve figure and table captions — for example, "Figure 1: Location of the Study Area" rather than "Study area."

Ensure all equations are correctly numbered and formatted; some equation references (e.g., "Eq. 32") appear inconsistent.

Mention the software used for GIS analysis (ArcGIS, QGIS, etc.) and its version.

### 4. Results

**Strengths:**
Results are clearly structured, showing the vulnerability classes and nitrate concentration distribution. The validation approach using nitrate data strengthens the study's reliability.

**Suggestions:**

Figures (especially the vulnerability and nitrate maps) should include clear legends, north arrows, and scales.

Include numerical details in the text that correspond to maps — for example, specify which regions fall under each vulnerability class.

Table 3 is informative but could be reformatted for clarity (e.g., separating vulnerability and nitrate concentration ranges into distinct columns).

Ensure figure numbers are consistent (e.g., "FIG. 43" and "FIG. 58" appear to be typos).

### 5. Discussion

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**Strengths:**
The discussion effectively relates the findings to previous studies (e.g., Mangoua, Kouadio, Dibi) and provides logical interpretations of vulnerability patterns.

**Suggestions:**

Simplify long sentences for better readability.

Strengthen the interpretation of how land use, geology, and slope interact to influence vulnerability.

Discuss briefly any limitations of the PaPRI method and suggest possible future improvements or complementary methods.

## 6. Conclusion

Strengths:
The conclusion summarises the major findings well and highlights the significance of the vulnerability map for protection planning.

Suggestions:

Add a final sentence emphasising practical implications, such as "The results can assist local authorities in prioritising pollution control measures and monitoring programs."

Avoid repeating numerical details already presented in the results section.