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REVIEWER'S REPORT

Manuscript No.: **IJAR- 59578**

Title: DOMESTIC WASTEWATER MANAGEMENT AND ENVIRONMENTAL IMPACTS IN THE ZANZAN AND LYCÃ‰E NEIGHBOURHOODS OF BONDOUKOU, CÃ"TE DÂ'IVOIRE.

Recommendation:
Accept as it is .....
Accept after Moderate revision.....
Accept after Major revision
Do not accept (*Reasons below*)

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

Reviewer Name: **Dr. ANAPANA GOPAL**

Reviewer's Comment for Publication.

General Comments
The manuscript examines domestic wastewater management practices and their environmental and reported health impacts in the Zanzan and Lycée neighbourhoods of Bondoukou, Côte d'Ivoire. The study addresses an important public health and environmental management issue, particularly in rapidly urbanising towns where sanitation infrastructure is inadequate.
The study combines household surveys involving 200 households, institutional interviews, field observations, and geographical mapping using QGIS. The findings highlight limited drainage coverage, widespread wastewater discharge into streets, and insufficient sanitation awareness among residents. The study also identifies infrastructure improvement and community awareness as important priorities.
However, several methodological and reporting issues need to be addressed before the manuscript can be considered for publication. The sampling procedure, data analysis methods, interpretation of health-related findings, and accuracy of the reported statistics require clarification. The manuscript would also benefit from improved consistency between the abstract, results, figures, and discussion, together with a more detailed explanation of the contribution of GIS to the study.
Content and Originality
The manuscript addresses a relevant environmental and public health problem and provides locally specific information about wastewater management practices in two neighbourhoods of Bondoukou. The integration of household perceptions, institutional interviews, field observations, and spatial information has potential value for local sanitation planning.
However, the authors should clarify the specific research gap and explain how the study advances existing research on wastewater management in Côte d'Ivoire and other West African urban areas. The originality of combining survey data and GIS

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should be demonstrated through the actual spatial analyses and their contribution to identifying priority areas or planning interventions.
The manuscript also needs to distinguish between residents' reported health experiences and objectively established health outcomes. The findings concerning malaria and tuberculosis should not be interpreted as demonstrating a causal relationship with domestic wastewater discharge without appropriate epidemiological or environmental evidence.
The practical recommendations are relevant, but their suitability should be discussed in relation to local infrastructure, financial constraints, and environmental conditions.

Technical Quality

The manuscript requires further clarification and improvement in its research methodology, statistical reporting, and interpretation of findings.
1. Sampling procedure: The authors surveyed 200 households, with 100 households from each neighbourhood. However, the sampling method, household selection criteria, sample-size justification, and response rate should be clearly described to establish the representativeness of the data.
2. Data analysis: The manuscript mainly presents percentages and descriptive findings. The authors should explain the statistical procedures used to analyse the questionnaire responses and compare the two neighbourhoods. Where appropriate, suitable statistical tests should be considered, with test statistics and p-values reported.
3. Consistency of numerical results: Some reported values require verification. For example, the housing categories reported for Zanzan in the Results section total 101% (77% modern, 17% semi-modern, and 7% traditional). The authors should check the underlying data, calculations, and figures and correct any discrepancies.
4. Health impact assessment: The reported occurrence of malaria and tuberculosis appears to be based on interviews and household responses rather than verified clinical records. The authors should clarify the source of these data and avoid presenting self-reported diseases as confirmed consequences of wastewater exposure.
5. Environmental assessment: Although the manuscript discusses pollution of soil and water resources, no direct measurements of microbiological contamination or water quality are presented. The authors should distinguish observed environmental conditions and perceived pollution from experimentally confirmed contamination.
6. GIS and spatial analysis: The study identifies the use of QGIS, Google Earth Pro, and a Digital Elevation Model. However, the spatial analysis is not sufficiently developed in the presented results. The authors should explain the GIS procedures used and demonstrate how spatial information supports the identification of wastewater discharge locations, environmental risk areas, or priority intervention zones.
7. Methodological transparency: The authors should provide additional information about questionnaire development, field observation procedures, interview analysis, data validation, and ethical considerations, including informed consent and the handling of household information.
8. Interpretation of findings: The manuscript suggests that decentralised sanitation systems may be preferable to waiting for a centralised sewerage network. This recommendation should be supported by a more explicit assessment of technical feasibility, local hydrogeological conditions, maintenance requirements, and safe faecal sludge management.

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Language and Presentation

The manuscript is generally understandable, but language editing and technical proofreading are required to improve clarity and consistency.

- Correct grammatical errors, spacing problems, punctuation, and inconsistent terminology throughout the manuscript.
- Standardise the spelling of neighbourhood names, particularly "Zanzan" and "Lycée," across the abstract, main text, figures, and conclusion.
- Ensure consistent use of terms such as domestic wastewater, stormwater drainage, sanitation infrastructure, and wastewater discharge.
- Improve the clarity of sentences describing health impacts and environmental risks.
- Standardise percentage notation, figure captions, units, and abbreviations.
- Correct typographical errors and incomplete sentences, including the punctuation problem in the discussion concerning WHO sanitation guidance.
- Improve the readability and labelling of figures, particularly where French labels appear in an otherwise English-language manuscript.

The authors should ensure that the language distinguishes clearly between observed conditions, respondents' perceptions, and conclusions supported by measured evidence.

Structure and Organization

The manuscript follows a conventional scientific structure, but several sections require refinement to improve the flow and presentation of the research.

- Abstract: Present the principal findings consistently with the results and clearly distinguish reported health impacts from objectively verified outcomes.
- Introduction: Strengthen the research gap and explain the specific contribution of the study to wastewater management and urban sanitation planning.
- Materials and methods: Expand the description of sampling, questionnaire administration, statistical analysis, GIS procedures, and ethical considerations. The repeated description of the datasets should also be consolidated.
- Results: Present the household survey and institutional interview findings systematically, ensuring that all percentages and figures are accurate and consistent.
- Discussion: Compare the findings with relevant studies while distinguishing similarities from differences in study design, location, and evidence.
- Limitations: The manuscript acknowledges the absence of environmental contamination measurements and longitudinal disease data. These limitations should be discussed more prominently when interpreting the health implications.
- Conclusion: Ensure that the recommendations follow directly from the findings and acknowledge the need for further environmental and epidemiological investigation.

The figures should be numbered sequentially and cited correctly in the text. The transition between survey findings, spatial evidence, and recommendations should also be strengthened.

References and Citations

The manuscript includes references on sanitation, environmental management, urbanisation, and health risks. However, the references and their use in the text require careful verification.

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- Verify the accuracy and traceability of all references, including publication details, institutional reports, and DOI information.
- Ensure that all in-text citations correspond to entries in the reference list and that all listed references are cited appropriately.
- Standardise the reference format according to the journal's guidelines.
- Check the consistency of author names, publication years, journal titles, page ranges, and punctuation.
- Support statements about malaria transmission, wastewater-related health risks, and sanitation standards with relevant authoritative scientific or public health sources.
- Verify demographic statistics and institutional policy claims using reliable official sources wherever possible.
- Ensure that references used to support specific claims are directly relevant to those claims.

Particular attention should be paid to references supporting the reported relationship between wastewater discharge and disease occurrence, as well as claims concerning sanitation infrastructure and public health.

Overall Recommendation

Moderate Revision

The manuscript addresses a significant environmental and public health concern and offers potentially useful information for improving domestic wastewater management in Bondoukou. The combination of household surveys, institutional interviews, field observations, and mapping provides a useful foundation for local sanitation planning.

However, the manuscript requires improvements in sampling and analytical transparency, verification of numerical results, clarification of health-related evidence, and a more convincing demonstration of the contribution of GIS. The authors should also strengthen the discussion, verify references, and ensure that the recommendations are appropriately supported by the findings.

These revisions are necessary to improve the scientific reliability, clarity, and practical value of the manuscript.

Final Decision

Moderate Revision

The manuscript may be reconsidered for publication after the authors address the methodological and reporting concerns, correct inconsistencies in the results, clarify the interpretation of reported health impacts, and strengthen the spatial analysis and supporting evidence. The revised manuscript should undergo further review to determine whether these issues have been satisfactorily resolved.