ISSN: 2320-5407

ISSN NO. 2320-5407

International Journal of Advanced Research

Publisher's Name: Jana Publication and Research LLP

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REVIEWER'S REPORT

Manuscript No.: IJAR- 59781

Title: *Ecosystem Services of Sahelian Wetlands: A Perception-Based Assessment in the Rural Commune of Dogo (Zinder Region, Niger).*

Recommendation:
Accept as it is .....
Accept after Minor 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.

1. General Comments

The manuscript examines the ecosystem services provided by wetlands in the rural commune of Dogo, Zinder Region, Niger, using a perception-based assessment of local wetland users. The study focuses on provisioning, supporting, and regulating services, including water resources, market gardening, fishing, livestock fodder, traditional medicine, biodiversity habitats, microclimate regulation, and other ecological functions.

The study addresses an important environmental and socioeconomic topic, particularly in the Sahelian region, where wetlands play a significant role in household livelihoods, food security, and natural resource management. The integration of local knowledge with an earlier remote-sensing inventory of wetlands is a positive aspect of the research. The survey of 42 respondents across 33 sampled wetlands provides useful preliminary information about how local communities use and perceive these ecosystems.

However, several methodological and scientific issues need to be addressed before the manuscript can be considered for publication. The most important concerns include inconsistencies in the reported frequencies of market gardening, insufficient clarification of the sampling and respondent selection procedures, limited evidence supporting some ecological service claims, and the absence of a proper assessment of cultural ecosystem services despite the stated use of the Millennium Ecosystem Assessment framework. In addition, the identification of several plant and animal species requires verification, and the discussion sometimes presents respondents' perceptions as established ecological facts.

The manuscript has potential value, but substantial revision is necessary to improve its methodological transparency, accuracy of data presentation, scientific interpretation, and overall quality.

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2. Content and Originality

1. **Research relevance:** The study addresses an important subject concerning the ecological and socioeconomic importance of Sahelian wetlands. The focus on Dogo provides useful local-level information that may support wetland management and conservation planning.
2. **Original contribution:** The manuscript attempts to extend an earlier remote-sensing inventory of 2,003 wetlands by examining the ecosystem services perceived and used by local communities. This combination of spatial information and local knowledge represents a useful approach. However, the authors should explain more clearly what new scientific understanding this perception-based assessment contributes beyond the earlier inventory.
3. **Ecosystem services framework:** The study adopts the four categories of the Millennium Ecosystem Assessment: provisioning, regulating, supporting, and cultural services. However, the Results section mainly discusses provisioning, supporting, and regulating services. Cultural services are not adequately investigated. The authors should either include information on cultural, recreational, spiritual, aesthetic, and heritage values or explain why these services were not assessed.
4. **Provisioning services:** The manuscript provides useful information on water use, fishing, livestock fodder, plant-based food, traditional medicine, fencing materials, wood, organic manure, and handicrafts. However, the analysis is primarily based on the frequency of responses. The authors should distinguish between the number of respondents who mentioned a particular use and the actual quantity or economic value of resources obtained.
5. **Market gardening and household livelihoods:** Market gardening is presented as the principal economic activity in the study area. The manuscript reports crop diversity, cultivation periods, irrigation practices, cropping cycles, and income categories. These findings are relevant, but the economic contribution of market gardening requires more detailed interpretation. In particular, the authors should clarify whether the reported income represents gross revenue or net profit after deducting production costs.
6. **Supporting ecosystem services:** The study identifies wetlands as habitats for fish, birds, reptiles, amphibians, insects, and mammals. However, the evidence is based mainly on respondents' observations and reported knowledge. The authors should avoid presenting these observations as a comprehensive biodiversity inventory unless the species were independently documented through field observations, photographs, or biological surveys.
7. **Regulating ecosystem services:** The manuscript discusses microclimate moderation, shade, aeolian-sand trapping, and biological pest control. These are important wetland functions, but the supporting evidence is limited. For example, the reported temperature changes are based on respondents' perceptions rather than measured temperature and humidity differences. The authors should clearly distinguish perceived regulating services from experimentally or instrumentally measured ecological functions.
8. **Environmental management implications:** The manuscript recommends integrating wetland services into the commune's Local Development Plan and considering collective wetland management. These recommendations are relevant. However, they would be stronger if supported by specific findings on land-use

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pressure, water availability, resource conflicts, vegetation degradation, or existing management practices.

9. **Gender and social dimensions:** The study reports that 97.6% of respondents were men. This is an important limitation because women may have significant roles in collecting, processing, and using wetland resources. The authors should discuss how the limited representation of women may affect the assessment of household food, medicinal plants, and other ecosystem services.

10. **Scientific contribution:** The manuscript is largely descriptive. The authors should strengthen its analytical contribution by explaining how wetland size, hydrological conditions, vegetation distribution, and local resource-use patterns influence the availability and perceived importance of different ecosystem services.

3. Technical Quality

A. Study Design and Sampling

1. The study states that 33 wetlands were selected from 322 wetlands in the central-eastern sector, representing approximately 10% of the total. However, the manuscript should explain how the 322 wetlands were identified and whether the sampling frame was derived entirely from the 2023 remote-sensing inventory.

2. The authors should clarify the relationship between the 2,003 wetlands identified across the entire commune and the 322 wetlands included in the sampling frame. The geographical boundaries of the central-eastern sector should be clearly described.

3. The stratified sampling procedure is described as being based on wetland size classes: small, medium, and large. However, the criteria for classifying the wetlands should be explained more clearly, including how the surface area of each wetland was measured.

4. The sampling equation is not clearly formatted in the manuscript. The expression for the sampling fraction should be presented correctly as:

$$ f_i = \frac{n}{N} $$

The authors should also clarify whether the same sampling fraction was applied proportionally to all size classes.

5. The manuscript states that two wetland owners declined to participate and that two replacement sites were selected based on a 5% non-response allowance. However, the calculation and replacement procedure should be explained more clearly. The authors should specify whether the replacement wetlands were selected randomly from the same size strata as the non-responding wetlands.

6. The final sample comprised 42 respondents from 33 wetlands. The authors should explain how respondents were selected at each wetland, whether multiple users were interviewed at some sites, and whether the respondents were owners, tenants, workers, fishers, or other resource users.

7. The manuscript uses the terms "owner," "main user," "key informant," and "wetland user." These terms should be clearly defined. The authors should explain whether the questionnaire was administered to all categories of users or only to the principal landholders.

8. The questionnaire is described as structured, but its main sections, question types, response categories, and validation procedures are not sufficiently detailed. The authors should provide the questionnaire as supplementary material or explain its structure in the Methods section.

9. The field survey period should be stated explicitly. The manuscript includes field photographs from March, April, and August 2024, but does not clearly specify the

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complete survey period or whether all interviews were conducted during the same season.

10. Ethical considerations should be addressed. The authors should state whether informed consent was obtained from respondents and whether permission was secured from relevant local authorities. If formal ethical approval was not required, this should be clarified.

B. Data Collection and Measurement

1. The study is described as perception-based, but the manuscript sometimes presents the results as direct measurements of ecosystem functions. The authors should consistently identify which findings were based on interviews, field observations, remote sensing, or instrumental measurements.
2. The authors should explain how the frequency of responses was calculated. For example, where respondents could identify multiple uses or species, the manuscript should clarify that the percentages represent multiple-response frequencies and therefore may exceed 100% when combined.
3. The methods section mentions that analyses were descriptive and based on response frequencies. However, there is little explanation of how the qualitative information from respondents was recorded, grouped, and interpreted.
4. The study should explain whether the questionnaire was administered in French, Hausa, or another local language, and whether responses were translated before analysis. This is important because local names and interpretations of ecosystem services may differ across communities.
5. The authors should clarify whether plant and animal species were identified solely through local names provided by respondents or whether scientific identification was confirmed through field observations and taxonomic references.
6. Several scientific names are presented without adequate taxonomic verification. The authors should check the spelling and current accepted names of the reported species, particularly *Platydemus manokwari*, *Reticulitermes lucifugus*, *Spartina maritima*, and *Typha australis*.
7. Some species are listed in multiple habitat categories. The authors should explain whether these represent different life stages, seasonal habitat use, or simply different observations by respondents.
8. The manuscript reports that certain animals are trapped and consumed and that parts or carcasses of some species are used in traditional medicine. These claims should be presented carefully, with clarification of whether they were directly observed or reported by respondents.

C. Data Consistency and Statistical Presentation

1. **Inconsistency in market-gardening frequency:** The manuscript reports that 88.1% of respondents identified market gardening as a use of wetland water resources. However, the Results section later states that 16.7% of respondents reported that their wetlands were not used for market gardening. These figures imply a different proportion of users. The authors should verify the original dataset and reconcile the reported percentages.
2. The Discussion states that market gardening was practised around 83% of surveyed sites, whereas the Abstract and Results report 88.1% of respondents. The authors should clarify whether these percentages refer to wetlands or individual respondents and use consistent denominators.

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3. The manuscript reports that 92.36% of respondents use wetland vegetation as livestock fodder. However, with a sample of 42 respondents, the percentage should be checked against the actual count. The authors should verify the calculation and standardize the percentage throughout the manuscript.
4. The reported cropping-cycle frequencies are 40.5% for one cycle, 47.2% for two cycles, and 4.8% for three cycles. These values do not account for all respondents. The authors should clarify whether the remaining respondents did not cultivate crops, provided incomplete responses, or belonged to another category.
5. The authors should check the reported percentages in the income distribution and clarify the category "Not Cultivated" in Figure 11. It should be clear whether this category represents respondents who did not practise market gardening or those who did not report income.
6. The manuscript reports income per production cycle but does not provide information on the sample size for each income category. The authors should provide the corresponding respondent counts alongside percentages.
7. The authors should clarify whether income estimates represent gross sales, household earnings, or net income after deducting labour, irrigation, fertilizer, seed, transport, and other production costs.
8. Table 1 presents fish species with response frequencies of 97.62%, 95.24%, and 57.14%. The authors should clarify whether these percentages indicate the proportion of respondents who identified each species or the proportion of wetlands in which the species was recorded.
9. Table 3 and Figure 12 present numerous species and habitat categories. The authors should clarify whether each frequency represents an independent response and whether respondents could identify the same species in multiple habitat locations.
10. The statistical analysis is limited to descriptive frequencies. While this may be appropriate for an exploratory perception-based study, the authors should consider whether comparisons between wetland size classes, types of users, or different ecosystem-service categories would provide additional insight. If no inferential analysis is undertaken, the descriptive nature of the study should be emphasized.

4. Language and Presentation

The manuscript is generally understandable and follows a recognizable scientific structure. However, several grammatical, typographical, taxonomic, and formatting problems need correction.
1. The phrase "Key words:-" should be standardized as "Keywords:".
2. The expression "Ramsar Conventionon Wetlands(RCS, 2018)" contains spacing and formatting errors. It should be corrected to "Ramsar Convention on Wetlands (2018)" or the appropriate institutional author name, depending on the source.
3. The sentence "The sampling sector comprised 322 wetlands" should be reviewed to ensure that the geographical and sampling terminology is consistent throughout the manuscript.
4. The expression "inFigure 2" should be corrected to "in Figure 2." Similar spacing errors occur in several sections.
5. Scientific names should be italicized consistently throughout the manuscript. Examples include *Clarias gariepinus*, *Oreochromis niloticus*, *Protopterus annectens*, *Typha australis*, and *Hyphaene thebaica*.

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6. Several scientific names contain missing spaces or inconsistent formatting, including "Protopterusannectens," "Alysicarpusovalifolius," "Piliostigmareticulatum," "Sclerocaryabirrea," and "Dactylocteniumaegyptium." These should be corrected throughout the text, tables, and figures.
7. The terms "response frequency," "response rate," and "frequency of citation" are used in different figures. The authors should adopt one consistent expression and define it in the Methods section.
8. The manuscript alternates between XOF and FCFA when presenting income categories. One consistent currency format should be used, with the currency clearly identified.
9. Some figure captions contain punctuation and spacing problems. For example, "Source : Authors' field survey" should be standardized as "Source: Authors' field survey."
10. The expression "Typhaaustralis" should be corrected to "*Typha australis*."
11. The use of the terms "wetland," "depression," "cuvette," and "oasis depression" should be standardized or clearly defined so that readers can understand whether these terms refer to the same geographical features or different ecosystem types.
12. Some sentences in the Discussion are excessively long and contain multiple ideas. These should be divided into shorter sentences to improve readability.
13. The manuscript should undergo professional English-language editing to correct grammar, punctuation, spacing, and scientific terminology.

5. Structure and Organization

The manuscript follows a conventional scientific structure with an abstract, introduction, materials and methods, results, discussion, conclusion, author contributions, conflict of interest, and references. Nevertheless, several sections require improvement.

1. **Abstract:** The abstract provides the study objectives, sampling approach, and major findings. However, it should clarify that the assessment is based on the perceptions of 42 wetland users rather than direct biophysical measurements. The main findings should also be consistent with the corrected percentages in the Results section.
2. **Introduction:** The introduction provides a useful background on the importance of wetlands in Niger and the Sahelian region. However, the research gap should be more explicitly stated. The authors should explain why a perception-based assessment is necessary after the earlier remote-sensing inventory.
3. **Study Area:** The study-area description provides geographical coordinates, climatic information, and population details. However, the authors should include a clearer description of the hydrological characteristics, vegetation, land-use patterns, and major livelihood activities of the central-eastern sector.
4. **Sampling Design:** The sampling procedure should be presented more clearly, preferably with a simple flow diagram showing the total number of wetlands, the sampling strata, the selected sites, non-response, replacement sites, and the final number of respondents.
5. **Field Survey:** The questionnaire structure, interview procedure, respondent selection, survey dates, and ethical considerations should be explained in greater detail.
6. **Results:** The Results section contains useful descriptive information, but the presentation is heavily dependent on figures and tables. The authors should improve

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the connection between the text and visual data and avoid repeating the same numerical information in multiple places.

7. **Provisioning Services:** The subsection on provisioning services is detailed, but the organization could be improved by grouping the findings into water-related uses, vegetation-related uses, soil-related uses, and agricultural production.

8. **Supporting Services:** The biodiversity-related information should be presented more cautiously. A distinction should be made between species reported by respondents, species directly observed during fieldwork, and species confirmed through taxonomic identification.

9. **Regulating Services:** This section would benefit from a clearer explanation of the evidence used to identify each regulating service. Perceived temperature moderation and sand trapping should not be presented as measured ecological outcomes.

10. **Cultural Services:** A separate subsection should be included to address cultural ecosystem services, or the authors should explain why this category was excluded. Its absence is particularly noticeable because the study explicitly claims to follow the four-category Millennium Ecosystem Assessment framework.

11. **Discussion:** The Discussion provides comparisons with earlier studies and offers management implications. However, it should be reorganized around the major findings and should distinguish the study's own observations from interpretations supported by previous research.

12. **Conclusion:** The conclusion summarizes the importance of Dogo's wetlands but contains the expression "substantial material benefits to thousands of livelihoods." This statement is not directly supported by a survey of 42 respondents and should be revised. The authors should avoid extrapolating the findings to thousands of livelihoods without appropriate evidence.

13. A separate **Limitations of the Study** subsection should be included. It should address the small sample size, restricted geographical coverage, male-dominated respondent group, perception-based methodology, lack of direct ecological measurements, and uncertainty in species identification.

6. References and Citations

The manuscript includes references relevant to wetland ecosystems, Sahelian resource management, ecosystem services, and agricultural activities in Niger. However, the reference list and in-text citations require careful verification.

1. The authors should verify the accuracy and completeness of all bibliographic information, including author names, publication years, journal titles, volume numbers, page ranges, and DOI details.

2. The reference to the Ramsar Convention and the source identified as "RCS (2018)" should be checked. The institutional author and publication details should be presented accurately and consistently.

3. The manuscript cites the Millennium Ecosystem Assessment (2005), which provides the conceptual framework for the study. The complete and correct reference should be included, and the four ecosystem-service categories should be applied consistently.

4. The reference to Costanza et al. (1997) is relevant to the general economic valuation of ecosystem services. However, the authors should avoid using this reference as direct evidence of the economic value of Dogo's wetlands, since no monetary valuation was conducted in the present study.

5. The manuscript cites Moussa Lawali (2024) as the source of the earlier remote-sensing inventory. The authors should provide complete bibliographic details and

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clarify whether this work is a master's thesis, dissertation, or another research document.
6. Recent references from 2025 and 2026 are included in the Discussion. The authors should verify their publication status, complete bibliographic information, and relevance to the specific claims being supported.
7. The reference to Salifou et al. (2026) should be checked carefully to ensure that the cited article's findings support the discussion concerning hydrological stress and Typha-dominated vegetation at Lake Guidimouni.
8. The authors should ensure that all references cited in the text appear in the reference list and that no listed references remain uncited.
9. Several references are theses, dissertations, internship reports, and institutional documents. These should be clearly identified and formatted consistently.
10. The authors should check the consistency of French-language titles, accents, capitalization, and journal names in the reference list.
11. The manuscript should include additional recent peer-reviewed literature on wetland ecosystem-service assessment, community-based wetland management, and perception-based ecological valuation in the Sahel and West Africa.
12. The final reference list should follow the journal's prescribed referencing style consistently.

7. Overall Recommendation

Minor Revision

The manuscript addresses an important environmental and socioeconomic topic and provides useful preliminary information on the ecosystem services of Sahelian wetlands in the rural commune of Dogo, Niger. Its integration of local perceptions with an earlier remote-sensing inventory is a positive feature, and the findings may contribute to local wetland management and conservation planning.

However, substantial revisions are required before the manuscript can be considered for publication. The most important concerns are:

1. Inconsistencies in the reported frequencies of market gardening and other activities that require verification against the original dataset.
2. Insufficient explanation of the sampling procedure, respondent selection, and relationship between the 322 sampled wetlands and the 2,003 wetlands identified across the commune.
3. Limited information on questionnaire design, field-survey procedures, and ethical considerations.
4. The need to distinguish respondents' perceptions from directly measured ecological functions and verified biodiversity records.
5. Incomplete assessment of cultural ecosystem services despite the stated use of the four-category Millennium Ecosystem Assessment framework.
6. The need to verify the scientific names and identification of several plant and animal species.
7. Insufficient economic analysis of market gardening and other provisioning services, particularly the distinction between gross income and net profit.
8. Overgeneralization in some conclusions, particularly claims concerning the benefits to thousands of livelihoods.
9. Language, formatting, figure, table, and reference-list inconsistencies requiring correction.

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The authors should carefully verify the dataset, revise the methodology and statistical presentation, strengthen the discussion of ecological and socioeconomic implications, and ensure that all conclusions are supported by the evidence collected. Addressing these concerns would considerably improve the scientific quality and credibility of the manuscript.

8. Final Decision

Minor Revision

The manuscript may be reconsidered after minor revisions. The subject is relevant, and the study offers potentially useful information on the role of Sahelian wetlands in supporting local livelihoods and ecosystem functions. However, the authors must address the data inconsistencies, clarify the sampling and data-collection procedures, strengthen the evidence supporting ecological interpretations, and improve the assessment of ecosystem-service categories.

Particular attention should be given to verifying the reported percentages, clarifying the distinction between perceived and measured ecosystem services, and ensuring that the conclusions do not extend beyond the scope of the study.