JTCA SUBMISSION GUIDELINES

Theme:
Urban Heat Islands & Green Infrastructure
Journal of Trees for Climate Adaptation (JTCA)

FOCUS OF THE JOURNAL

The Journal of Trees for Climate Adaptation (JTCA) currently invites submissions exclusively under the theme:

Urban Heat Islands & Green Infrastructure.

This inaugural focus explores urban heat and how trees, vegetation, and landscape design mitigate rising urban temperatures. We welcome insights that combine science, perception, and innovation, from field research to spatial mapping, that illuminate how cities can cool, adapt, and thrive.

Topics may include (but are not limited to):

1. Urban heat mapping and modelling
2. Cooling benefits of trees and green infrastructure
3. GIS and remote sensing for urban heat analysis
4. Climate perception and heat awareness in communities
5. Policy, design, and planning for climate-resilient cities
6. Urban ecology and tree-based adaptation strategies

TYPES OF SUBMISSIONS

1	**Research Articles (3,000–6,000 words)**	Empirical studies or applied analyses on UHI and tree-based adaptation.
2	**Review Papers (up to 8,000 words)**	Syntheses of current knowledge, identifying research gaps.
3	**Case Studies / Field Notes (1,500–3,000 words)**	Practical experiences or site-level evidence of UHI interventions.
	Commentaries/ Opinion / Perspectives (1,000–2,000 words)	Thought pieces exploring perceptions, policy, or innovation in urban heat management.

MANUSCRIPT FORMATTING

Format	.docx (Microsoft Word)
Font	Times New Roman, size 12, 1.5 line spacing
Include	Title, Author(s) and Affiliation(s), Abstract (150–250 words), Keywords (4–6)
Structure	Introduction, Methods, Results, Discussion, Conclusion (IMRaD)
Figures and tables	should be embedded and clearly captioned.
Referencing	Follow **APA 7th Edition** for referencing.

Hyperlink Citations: Link the citation on word to the article DOI or URL (*Authors are strongly encouraged to hyperlink in-text citations (e.g NGS, 2025) for easier reviewer verification.)*

ETHICS AND INTEGRITY

JTCA upholds the principles of originality, transparency, and respect for intellectual contribution. All manuscripts must be original and not under consideration elsewhere. Plagiarism, data manipulation, or uncredited reuse of material will lead to disqualification.

PEER REVIEW PROCESS

All manuscripts undergo double-blind peer review by subject specialists. Reviewers evaluate scientific rigor, clarity, and contribution to urban heat and climate adaptation knowledge. Authors may be invited to revise before acceptance.

PUBLICATION FEES

Submission Fee: USD **$30** Publishing Fee: USD **$75**

Fees sustain the review process, editorial design, and open-access hosting.
Discounted rates apply for registered JTCA members

LAYOUT

Below is the proposed layout for your work

Author Information Format

Each Author's name should be written in the format Surname, First Name, (e.g Nkomo Nicolla for Nkomo.N) . Please include institutional affiliation(s) and contact information.

For Multiple Authors;

Please list all contributors in order of significance to the research, separated by commas. E.g (Nkomo Nicolla[1], Johns Samantha[2], Zhou Tendai[3]).*

The corresponding author should be clearly identified with an asterisk and will be responsible for all communications during the submission, review, & publication process.*

Example: *Nkomo Nicolla[1], Dube Tendai[2], and Moyo Lindiwe[3]**

[1]Journal of Trees for Climate Adaptation (JTCA), Harare, Zimbabwe, [2]University of Zimbabwe, Department of Geography, Harare, [3]Midlands State University, Faculty of Environmental Science, Gweru

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Acknowledgements

Authors should acknowledge individuals, institutions, or organizations that contributed to the research but do not meet the authorship criteria. This may include technical support, data provision, editorial assistance, or general guidance.

Example:
The authors would like to thank the Harare City Council for providing spatial data and the Zimbabwe Meteorological Services Department for access to climate records.

If there are no acknowledgements, authors should state:

The authors declare no acknowledgements.

Funding

Authors must disclose all sources of financial support that made the research or publication possible. Include the name of the funding organization, grant number (if applicable), and a brief statement of the funder's role (if any).

Example:
This research was supported by the Green Urban Futures Grant (Grant No. GUF-2024-11) under the Climate Adaptation Research Program. The funders had no role in study design, data collection, analysis, or publication decision.

If the research received no funding, state:

This research received no external funding.

Author Affiliation:
Each author should include their current institutional or organizational affiliation and country. If the author is not affiliated with any institution, please indicate "Independent Researcher" or list your professional practice (e.g., "Environmental Consultant, Harare, Zimbabwe").

Figures and Tables

Numbering:
Figures and tables should be numbered sequentially in the order they appear in the text (e.g., Figure 1, Figure 2, Table 1, Table 2, Image 1, Image 2).

In-text citation:
Refer to each figure and table within the text.
Example: As shown in Figure 2, tree canopy density is higher in the northern section of the city.

Titles and captions:

1. **Each figure** should have a concise title below it (e.g., Figure 1. Land surface temperature map of Harare, 2024).
2. **Each table** should have its title above it (e.g., Table 1. Mean surface temperatures by land cover type).

Formatting:
Figures should be high-quality (minimum 300 dpi) in JPEG or PNG format. Tables must be editable text, not images.

Source attribution:
If figures or tables are reproduced or adapted from another source, clearly cite the original work below the caption in APA style.
Example: Source: Adapted from Smith et al. (2022).

Urban Tree Canopy and Surface Temperature: Assessing Cooling Benefits in Harare and Bulawayo, Zimbabwe

Author:

Nkomo Nicolla; University of Zimbabwe; Email: editor@jtca.org; DOI: (To be assigned by JTCA Publications)

Acknowledgement:
The authors would like to thank the Bulawayo City Council for providing data and the Zimbabwe Meteorological Services Department for access to climate records.

Funding:
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Key Words: *Urban Heat, Trees, Canopy, Temperatures*

Abstract

Urban Heat Islands (UHIs) have become an increasing environmental challenge in African cities due to rapid urbanization and reduced green cover. This study examines how tree canopy density influences surface temperature in Harare and Bulawayo, Zimbabwe, using satellite imagery and ground-based observations. Results indicate that areas with dense canopy cover recorded significantly lower surface temperatures—by up to 4.2°C—compared to built-up zones. These findings affirm the importance of urban trees in moderating urban heat and promoting resilience to climate extremes.

1. Introduction

Urban Heat Islands (UHIs) describe the phenomenon where urban regions experience higher temperatures than their rural surroundings due to human activities, built surfaces, and reduced vegetation (Oke, 1982). In Zimbabwe, the effects of UHIs are increasingly visible as cities expand without parallel greening strategies. Urban trees offer a natural cooling mechanism through shading and evapotranspiration (Bowler et al., 2010), yet their role in mitigating heat stress in semi-arid cities like Harare and Bulawayo remains underexplored. This study aims to assess how urban tree canopy influences surface temperature and to demonstrate how geospatial analysis can support climate-responsive urban planning.

2. Methods

2.1 Study Area Selection

The study focused on Harare and Bulawayo, Zimbabwe's two largest cities, chosen for their differing climate regimes and urban morphologies. Harare represents a humid subtropical climate with mixed-density vegetation. Bulawayo lies in a semi-arid zone characterized by sparse vegetation and higher diurnal temperature ranges. In each city, four representative zones were sampled: Central Business District, high-density suburb, low-density suburb, and urban parkland.

2.2 Data Sources and Acquisition

Landsat 9 OLI/TIRS imagery (30 m resolution) from June 2024 was sourced from the USGS Earth Explorer platform. Cloud-free images were prioritized to ensure clarity. Meteorological data for the same period were obtained from the Zimbabwe Meteorological Services Department (ZMSD). Field measurements were collected using calibrated handheld thermometers and GPS devices between 11:00 a.m. and 2:00 p.m. at 60 sampling points per city.

2.3 Data Preprocessing

All imagery was corrected for atmospheric and radiometric errors in QGIS 3.34 (Prizren) using the Semi-Automatic Classification Plugin (SCP). Bands 4 (Red), 5 (NIR), and 10 (Thermal Infrared) were extracted and clipped to city boundaries using official shapefiles from the Surveyor General's Office.

2.4 Deriving Vegetation and Temperature Indicators

Normalized Difference Vegetation Index (NDVI):

NDVI = \frac{(NIR - RED)}{(NIR + RED)}

Land Surface Temperature (LST): Derived from Band 10 following conversion of digital numbers to radiance, brightness temperature, and NDVI-based emissivity correction.

2.5 Field Observation and Validation

Ground temperature readings were compared with satellite-derived LST values for accuracy. Correlation coefficients (r) were computed in R (version 4.3) and Excel 365 to quantify relationships between NDVI and LST.

2.6 Spatial and Statistical Analysis

Spatial overlays of NDVI and LST were generated to visualize temperature variations by vegetation density. Zonal statistics quantified mean temperatures for each land use zone, while regression analysis tested NDVI's predictive strength on LST.

2.7 Ethical and Quality Control Measures

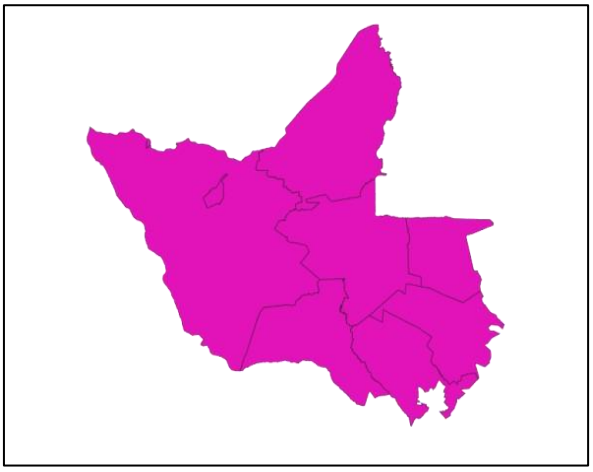
All data were collected in public areas to ensure ethical compliance. GPS coordinates were verified at reference points, and thermometers were calibrated before each session.

3. Results

Results revealed a clear inverse relationship between vegetation density and surface temperature.

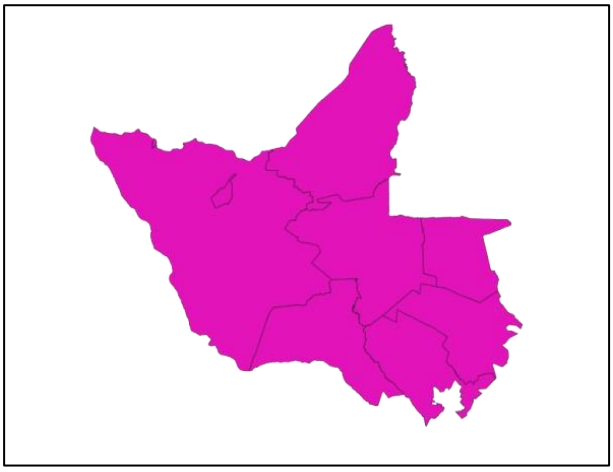
- Mean LST in high-density suburbs averaged 34.5°C, while low-density suburbs averaged 30.1°C.
- Urban parklands recorded the lowest mean temperature of 28.3°C, confirming the cooling benefits of dense tree canopy.
- The regression analysis showed a strong negative correlation between NDVI and LST (r = -0.78), consistent with findings from tropical cities (Imhoff et al., 2010).

Image 1: Urban Heat Map 2021



Source: Author

Image 2: Urban Heat Map 2024



Source: JTCA (2021)

4. Discussion

The results confirm that tree canopy significantly reduces surface temperatures, supporting global findings on the role of green infrastructure in urban microclimate regulation (Gill et al., 2007). Harare exhibited more fragmented green cover compared to Bulawayo, reflecting urban expansion pressures. Incorporating spatial analysis into city planning can help target priority zones for urban greening. Moreover, public perception of heat risk should be integrated into planning—linking scientific mapping with community experiences to enhance adaptive responses (Emmanuel & Krüger, 2012).

5. Conclusion

This study demonstrates that urban trees play a critical role in mitigating Urban Heat Islands in Zimbabwean cities. Green infrastructure should be prioritized in climate adaptation strategies, particularly in high-density residential areas. Future research could expand temporal analyses using multi-season imagery and integrate social data to explore behavioural adaptations to urban heat.

References

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Emmanuel, R., & Krüger, E. (2012). Urban heat island and its impact on climate change resilience in a shrinking city: The case of Glasgow, UK. Building and Environment, 53, 137–149. https://doi.org/10.1016/j.buildenv.2012.01.020

Gill, S. E., Handley, J. F., Ennos, A. R., & Pauleit, S. (2007). Adapting cities for climate change: The role of the green infrastructure. Built Environment, 33(1), 115–133. https://doi.org/10.2148/benv.33.1.115

Imhoff, M. L., Zhang, P., Wolfe, R. E., & Bounoua, L. (2010). Remote sensing of the urban heat island effect across biomes in the continental USA. Remote Sensing of Environment, 114(3), 504–513. https://doi.org/10.1016/j.rse.2009.10.008

Oke, T. R. (1982). The energetic basis of the urban heat island. Quarterly Journal of the Royal Meteorological Society, 108(455), 1–24. https://doi.org/10.1002/qj.49710845502

JTCA Opinion / Commentary Paper Format

Title:
Concise and reflective of the opinion piece.

Example:
"Why Urban Trees Are the Unsung Responders to Climate Stress"

Author Information:
Surname, First Name
Affiliation (Institution / Independent Researcher / Organization, City, Country)
Email address (for correspondence)

Abstract (100–150 words)

Provide a short overview of the main argument or reflection , what issue is being discussed, why it matters, and what the paper calls for (policy, awareness, or research focus).

Example: *Urban trees are emerging as frontline climate responders, yet their cooling potential remains undervalued in city planning. This commentary calls for integrating tree-based solutions into climate resilience frameworks and challenges researchers to bridge science with lived urban experiences.*

1. Introduction

Set the context and state the problem or debate. Describe why the issue matters, who is affected, and what is being overlooked.

2. Main Argument / Perspective

- Present your viewpoint with reasoning, supported by evidence, past research, or lived experience.
- You can include subheadings if needed (e.g., Policy Gaps, Urban Design Biases, Community Voices).
- Keep this section analytical but conversational — JTCA encourages insight and reflection over heavy data.

3. Reflections and Implications

Discuss the broader meaning — what does this opinion imply for climate adaptation, research, or practice?
Example:
"The gap between satellite data and street-level experience must close if tree-based cooling is to influence equitable climate policy."

4. Conclusion

End with a clear takeaway or call to action.
Example:
"Urban trees must move from background decoration to central climate infrastructure."

Acknowledgements (if any)
Recognize contributors, reviewers, or institutions that supported the reflection.

Funding (if any)
State any financial support or "This work received no external funding."

References (APA 7th Edition)

Include references for any cited literature, reports, or data.

Example:
Oke, T. R. (1987). Boundary layer climates. Routledge.

Disclaimer

This guide has been developed by the **Journal of Trees for Climate Adaptation (JTCA)** to assist authors in preparing and submitting manuscripts that align with the journal's focus and editorial standards.

The examples, formats, and recommendations provided are intended solely for guidance and do not represent an endorsement of specific research methods, viewpoints, or findings. Authors remain fully responsible for the originality, accuracy, and integrity of their work.

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