



STUDI PENGGUNAAN AKUSTIK INDEKS UNTUK MEMAHAMI PENGARUH ANTHROPOPHONY DI HUTAN WANAGAMA

Muhammad Tsaqif Haidar

21/479809/TK/52941

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INTISARI

Perubahan ekosistem alami menjadi ekosistem buatan pada menimbulkan tekanan ekologis seperti fragmentasi habitat dan gangguan antropogenik. Pengembangan alat berbasis akustik indeks telah banyak dilakukan namun belum mempertimbangkan pengaruh tekanan tersebut. Penelitian ini mengkaji bagaimana akustik indeks bekerja dalam pengaruh tekanan antropogenik yang berbeda dengan mengkarakterisasi komposisi *sonotype* dan menilai enam indeks akustik ACI (*Acoustic Complexity Index*), ADI (*Acoustic Diversity Index*), AEI (*Acoustic Evenness Index*), BI (*Bioacoustic Index*), NDSI (*Normalized difference Soundscape Index*), dan H (*Acoustic Entropy*) serta mengevaluasi keterkaitan antara komposisi sumber suara dan nilai indeks tersebut.

Data suara direkam selama 14 hari menggunakan *Automated recording device* (ARD) pada petak 17 (tekanan anthropony rendah) dan petak 18 (tekanan anthropony tinggi). Komposisi *sonotype* dihitung berdasarkan frekuensi kemunculan dan dominansi relatif, diikuti perhitungan indeks akustik dan analisis regresi linier multivariat untuk menguji hubungan antara komposisi suara dan masing masing indeks.

Hasil menunjukkan bahwa petak 18 memiliki proporsi anthropony sebesar 26,53 %, meningkat sekitar 16 % dibanding petak 17, yang menggeser rentang nilai dan keterhubungan komposisi suara dengan keenam indeks. Temuan ini mengindikasikan bahwa peningkatan tekanan antropogenik tidak hanya memodifikasi komposisi suara tetapi juga memengaruhi sensitivitas dan interpretasi metrik akustik dalam menilai kondisi ekosistem Hutan buatan.

Kata kunci: *Anthropophony*, Akustik indeks, *Sonotype*, Bioakustik

Pembimbing Utama : Ir. Sentagi Sesotya Utami, S.T., M.Sc., Ph.D., IPU.

Pembimbing Pendamping : Susilohadi, S.Si., M.Si., Ph.D.





The Study of *Acoustic* Indices to Understand the Influence of *Anthropophony* in Wanagama Forest

Muhammad Tsaqif Haidar

21/479809/TK/52941

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ABSTRACT

The transformation of natural ecosystems into artificial ones results in ecological pressures such as habitat fragmentation and anthropogenic disturbances. While the development of *acoustic* indices based tools has been extensive, the impact of these pressures has not been adequately considered. This study investigates how *acoustic* indices perform under different levels of anthropogenic pressure by characterizing *sonotype* composition and assessing six *acoustic* indices: the *Acoustic Complexity Index* (ACI), *Acoustic Diversity Index* (ADI), *Acoustic Evenness Index* (AEI), *Bioacoustic Index* (BI), *Normalized difference Soundscape Index* (NDSI), and *Acoustic Entropy* (H). Additionally, the study evaluates the relationships between sound source composition and the corresponding *index* values.

Continuous 14 day recordings were obtained using ARDs in two zones with contrasting *anthropophony*: Zone 17 (low) and Zone 18 (high). *Sonotype* composition was quantified by occurrence frequency and relative dominance. Six *acoustic* indices were computed via Python, followed by multivariate linear regression to assess *index* dependency on *sonotype* composition.

Findings reveal that high disturbance Zone 18 exhibited an *anthropophony* proportion of 26.53 %, approximately 16 % greater than Zone 17, resulting in significant shifts in *index* value distributions and a marked attenuation of *sonotype*–*index* correlations under elevated anthropogenic pressure. These results underscore the necessity of integrating *sonotype* and *acoustic index* analyses to enhance the sensitivity of *soundscape* monitoring frameworks in managed forest ecosystems.

Keywords: *Anthropophony, Acoustic indices, Sonotype, Bioacoustic*

Supervisor : Ir. Sentagi Sesotya Utami, S.T., M.Sc., Ph.D., IPU.

Co-supervisor : Susilohadi, S.Si., M.Si., Ph.D.

