

# Urban Women's Perceptions of Bird Conservation and Implications for Conservation Education: Evidence from Pekanbaru, Indonesia

Hadinoto Hadinoto<sup>1</sup>, Eni Suhesti<sup>2</sup>, Dodi Sukma R.A<sup>3</sup>, Sri Wahyuni<sup>4</sup>

<sup>1</sup> Universitas Lancang Kuning, Pekanbaru, Indonesia; [hadinoto@unilak.ac.id](mailto:hadinoto@unilak.ac.id)

<sup>2</sup> Universitas Lancang Kuning, Pekanbaru, Indonesia; [suhestieni@unilak.ac.id](mailto:suhestieni@unilak.ac.id)

<sup>3</sup> Universitas Lancang Kuning, Pekanbaru, Indonesia; [dodisukma@unilak.ac.id](mailto:dodisukma@unilak.ac.id)

<sup>4</sup> Universitas Lancang Kuning, Pekanbaru, Indonesia; [sriwahyuni91@unilak.ac.id](mailto:sriwahyuni91@unilak.ac.id)

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## ABSTRACT

Urbanization has significantly altered natural landscapes, affecting bird populations and their ecological functions, including seed dispersal and pest control. Despite their importance, birds in urban environments are often undervalued. This study aims to examine women's perceptions of bird conservation in urban areas and to identify key factors influencing these perceptions, including personal experience, environmental education, and access to green spaces. A cross-sectional survey design was employed in Pekanbaru City, involving 72 women selected through multistage random sampling across six sub-districts. Data were collected using a validated questionnaire, with reliability confirmed by a Cronbach's alpha value of 0.85. Perceptions of bird conservation were measured using a Likert scale and analyzed descriptively. The results indicate that participants demonstrated a high level of awareness, with a mean perception score of 105.50, categorized as "excellent." Personal experience with birds, higher levels of education, and proximity to green open spaces were identified as significant factors influencing positive perceptions. Additionally, older and more highly educated women exhibited stronger support for bird conservation. In conclusion, women represent a critical group in advancing urban bird conservation. Their positive perceptions and social roles position them as effective agents of change within families and communities. These findings highlight the importance of integrating gender-responsive approaches into conservation education programs to enhance ecological awareness and promote sustainable practices in urban environments.

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## Corresponding Author:

Hadinoto

Universitas Lancang Kuning, Pekanbaru, Indonesia; [hadinoto@unilak.ac.id](mailto:hadinoto@unilak.ac.id)

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## 1. INTRODUCTION

The rapid pace of urbanization has led to the transformation of natural landscapes into human-dominated environments. This process has caused significant biodiversity loss, especially in urban areas, where wildlife populations, including birds, have declined. Birds play essential roles in

ecosystems, such as seed dispersal, pest control, and maintaining ecological balance (Şekercioğlu et al., 2012). In addition to their ecological value, birds contribute to human well-being by providing aesthetic and psychological benefits, such as reducing stress through their songs (Stobbe et al., 2022); (Z. Li et al., 2025). The decline in bird diversity in urban environments underscores the need for increased public awareness and participation in conservation efforts. Effective conservation education can address this gap by fostering a deeper understanding of urban biodiversity and encouraging pro-environmental behaviors (Graviola et al., 2024); (Härtel et al., 2024); (Kalle et al., 2024); (Martell & Rodewald, 2024)

Perceptions significantly influence conservation behaviors and the success of educational programs. Understanding how individuals perceive the importance of birds in urban settings can inform the design of more effective conservation education initiatives. This study focuses on women's perceptions, recognizing that women often play key roles in households and communities. Women tend to be more attuned to environmental changes, and their perceptions of urban biodiversity may influence their participation in conservation efforts (Benedetti & Haaland, 2024). Given their strategic role, women's perspectives are vital for shaping educational frameworks that encourage active involvement in bird conservation in urban areas.

Women are often the primary managers of the household environment and have a significant influence in instilling values in the next generation. Through women's understanding and awareness of the importance of bird conservation, these values can be transmitted to children and other family members, creating a generation that is more concerned with environmental conservation (Fernández-Giménez et al., 2022) (Mathur et al., 2023). Women tend to have a higher level of sensitivity to environmental issues. Some studies report that Women are more likely to notice changes in their surroundings, including the presence of birds, their chirping sounds, or the loss of bird habitat. This makes women strategic partners in monitoring and protecting bird populations in urban areas (Benedetti & Haaland, 2024); (James et al., 2023); (Squires et al., 2021). Women play a vital role in local communities, through social groups, education, and other community activities. By raising awareness about bird conservation, women can be active agents of change in driving community-based conservation education initiatives in urban areas (Bhakti et al., 2023); (Maleknia, Elena Enescu, et al., 2024).

Women's perceptions of bird habitats in urban areas are interesting to study because they are often more sensitive to environmental issues and the aesthetics of their living environments. These perceptions can be influenced by various factors, such as daily experiences, knowledge of the benefits of birds, and cultural and social perspectives (Brace et al., 2021; Ma et al., 2023). Understanding women's perceptions of bird habitats in urban areas can provide valuable insights into efforts to conserve birds in urban environments and raise public awareness of the importance of urban wildlife conservation. Women's perceptions of birds also impact nature conservation. Due to environmental changes, particularly deforestation, poaching, and pollution, many bird species face the threat of extinction. Awareness of the importance of conserving these birds has become an integral part of global nature conservation efforts (Basak et al., 2022); (X. Li et al., 2020); (Maleknia, Elena Enescu, et al., 2024); (McCloy et al., 2024); (Sharma & Kreye, 2021).

Research on women's perceptions of birds has changed over time, influencing conservation practices, culture, and human relationships with nature. Some research on gender, such as the following; Most research on bird conservation and environmental education has not specifically addressed women's perceptions. (Lee et al., 2015). (Decker & Morrison, 2021)highlighted that environmental educators often lack confidence in identifying and addressing gender influences in nature-based education. According to Kaeser et al. (2018), women face various barriers to participating in community-based conservation programs, such as limited time and motivation. A study by (McCabe & Nekaris, 2019)found the influence of anthropomorphism in ecological conservation education among schoolchildren in Indonesia and identified gender differences in learning. (Schiffer, 2019)showed that gender balance in conservation groups can increase the effectiveness of conservation efforts. However, research on women's perceptions of bird conservation has not been conducted. This study investigates

how various factors, such as habitat conditions and environmental changes, have played a role in shaping current public views of birds. The urgency of this study is that women often face barriers to participating in community-based conservation education programs, such as limited time, confidence, and motivation. This indicates the need for further understanding of women's perceptions and roles towards birds as a form of conservation education. The problem based on the above is the level of women's perceptions of bird conservation efforts as a means of providing conservation education in urban areas. Another problem is how women view the presence of birds in urban areas, the factors that influence their views, and how these perceptions can impact their behavior and participation in urban environmental conservation.

This study aims to analyze women's perceptions of bird conservation as a means of providing conservation education in Pekanbaru City. In this study, perception is defined as the attitudes and affective connection that women have toward bird conservation in urban areas. This construct is measured through a Likert-scale survey, which captures the respondents' emotional and cognitive responses to urban bird conservation issues. The scale is designed to assess both knowledge of bird conservation and the emotional connection to wildlife in urban environments. The study aims to clarify whether perception is unidimensional or influenced by multiple factors such as attitudes, knowledge, and behavioral intentions.

This study is guided by the following research questions; What is the level and dimensional structure of women's perceptions of urban bird conservation? Do perception scores differ by age and education level? and which factors (e.g., environmental education exposure, green space access, prior experiences) predict women's perceptions of bird conservation?. Facing increasingly complex ecological challenges, a better understanding of how people view birds can help design more effective conservation strategies and promote a more balanced relationship between humans and nature (Graviola et al., 2024); (Härtel et al., 2024); (Kalle et al., 2024); (Martell & Rodewald, 2024). The results of this research are expected to support the development of conservation education programs and more inclusive policies in bird conservation efforts in urban areas.

## 2. METHODS

This research was conducted in Pekanbaru City. The materials used were *questionnaires*, and the research subjects were adult women in Pekanbaru City. Tools used: camera, writing instruments, recording device. Primary data in this study include women's perceptions of bird conservation as an effort to provide bird conservation education in urban areas.

Respondents were drawn from 6 sub-districts, with 2 urban villages (resulting in a total of 12) from each sub-district. The criteria for urban villages selected as samples were population (the two largest based on Pekanbaru in the 2023 data) (Table 1). Sample collection used a *multi-stage random sampling method*, dividing the population by sub-district, with 12 respondents selected from each sub-district. The respondents were selected randomly. The total number of respondents was 72.

**Table 1.** Details of respondent sampling locations

No.	Ward	Subdistrict	Information
1	Sari Valley	East Rumbai	The criteria for selecting sub-district locations are based on the largest population (top 2) for each sub-district.
2	Limbungan		
3	East Dawn Estuary	West Rumbai	
4	West Dawn Estuary		
5	Sri Meranti	Tassel	
6	Umban Sari		
7	Central Village	Sukajadi	
8	Malay Village		
9	Flat Land	Pekanbaru City	

No.	Ward	Subdistrict	Information
10	Sumahilang		
11	Moon Field		
12	New Village	Rifle	

Public perceptions of birds were collected using a questionnaire (which had been tested for validity and reliability) and analyzed using a Likert scale. The Likert scale is a tool used to measure a person's attitude, opinion, or perception towards a particular statement or question. The test used a list of questions with the following answers: Strongly agree (SS); Agree (S); Somewhat agree (CS); Disagree (TS); Strongly disagree (STS). The answers to the questions were then scored: SS = 5; S = 4; CS = 3; TS = 2, and STS = 1.

The perception categories are divided into "very good", "good", "fairly good", "not good" and "very not good". The number of questions used is 25, so the score range is 25 – 125. Based on the division into five categories, an interval value of 20 is obtained; thus, it can be stated as in Table 3.

**Table 2.** Categories of public perception of birds

No.	Score interval	Perception Category
1	25 – 45.00	Very Bad
2	45.10 – 65.00	Not good
3	65.10 – 85.00	Pretty good
4	85.10 – 105.00	Good
5	105.10 - 125	Very good

### 3. FINDINGS AND DISCUSSION

#### 3.1 Findings

##### 3.1.1 Women's perceptions of bird conservation based on age level

Bird conservation issues are gaining increasing attention in the discourse on biodiversity conservation. Conservation relies not only on scientific policies or actions but is also heavily influenced by public perceptions, including gender and age. Table 3 analyzes women's perceptions of bird conservation. The total number of respondents involved in this study was 72 people. The age of the respondents was divided based on the classification set by the World Health Organization (WHO), which included the age group of adolescents (12-19 years), early adults (20-24 years), intermediate adults, and the elderly (25-64 years). The results indicate that all groups exhibit positive perceptions, with the highest scores found in adults.

**Table 3.** Women's perceptions of bird conservation based on age level

No.	Age Level	Score Value	Perception Category
1	Adolescents (12 – 19 years)	104.92	Good
2	Young Adults (20 – 24 years)	103.07	Good
3	Adults (25 – 64 years)	109.50	Very good

The adult group (25–64 years) obtained the highest average perception score of 109.50, which is categorized as "Very Good," while the adolescent and young adult groups obtained scores of 104.92 and 103.07, respectively, both in the "Good" category. Numerically, there is an increase in perception scores with increasing age. This indicates that age plays a role in shaping understanding, awareness, and commitment to conservation issues. Adults tend to have greater experience, understanding, and social responsibility than younger age groups. Ecological awareness increases linearly with age,

primarily due to the accumulation of experience and exposure to environmental issues through media, education, and life experiences (Otto & Kaiser, 2014; Van Riper & Kyle, 2014).

Age plays a significant role in a person's understanding of the importance of species conservation, including birds. In adults, greater life experience likely strengthens ecological awareness through direct involvement in conservation activities, or at least observation of environmental degradation. Research by (Costa et al., 2025) and (Pollerhoff et al., 2022) shows that adulthood tends to be associated with greater empathy for wildlife and more active support for conservation. Conversely, adolescents and young adults, while having positive perceptions, lack sufficient experience to fully understand the long-term impacts of bird diversity loss. Younger adults also have lower levels of participation in conservation activities. However, technology and social media can be highly effective educational tools for this age group (D. Hoffmann, 2025).

Another factor that needs to be considered is how gender, particularly women, is constructed within the socio-cultural context of environmental issues. Some studies report that women are more sensitive to environmental issues than men. Women's social roles are closely tied to the management of household and local community resources (Cronkleton et al., 2021). Women's perceptions of bird conservation are generally shaped by social interactions, formal and informal education, and cultural values internalized from an early age. Adult women, as pillars of the household and community, have a significant influence in educating children and the surrounding community about the importance of bird conservation. This role reinforces positive perceptions, as reflected in the excellent perception scores.

Birds play vital ecological roles, such as seed dispersal, pest control, and environmental health indicators. Culturally, birds also hold symbolic and spiritual significance. Understanding these ecological functions and cultural values influences the level of public concern for bird conservation. Adults with more years of exposure to local wisdom are more likely to value birds as part of their ecological and cultural heritage. A study by (Maleknia, Heindorf, et al., 2024) confirmed that adults are better able to connect conservation with local cultural values, while younger generations tend to view conservation as an abstract, global issue often disconnected from everyday life.

The data in Table 4 emphasizes the importance of different educational approaches based on age. For adolescents and young adults, conservation programs should be more interactive, visual, and linked to hands-on experiences ( *experiential learning* ), such as *bird watching*, field training, or educational games based on digital applications. According to (Ricoy & Sánchez-Martínez, 2022) and (Zemljak et al., 2024), younger generations are more responsive to technology-based approaches in environmental education. Meanwhile, for adults, a more narrative and reflective approach, such as community discussions, local stories, or community service programs, would be more effective. Adult involvement is also crucial as mentors in intergenerational education programs to transfer ecological knowledge to younger generations.

This age-based perception data can serve as a basis for designing inclusive and responsive conservation policies. Strategically involving women from various age groups can foster intergenerational synergy in managing and protecting bird populations. On the one hand, adolescents and young adults bring energy and digital innovation, while older adults bring broader experience and social influence. In the context of participatory conservation policies, it is crucial to consider these demographic structures. A study by (Chanvin et al., 2023) suggests that conservation programs that integrate gender and age perspectives have a higher long-term success rate.

Table 4 provides a strong empirical picture that women's perceptions of bird conservation improve with age. The particularly positive perceptions among adults indicate a positive correlation between age and ecological awareness. This can be used as a basis for developing more targeted conservation strategies, both in environmental education and community engagement. Adapting approaches based on age and gender not only increases conservation effectiveness but also strengthens women's role in sustainably maintaining biodiversity.

### 3.1.2 Women's perceptions of bird conservation based on education level

Public perception of bird conservation is a crucial aspect of biodiversity conservation efforts. Women, as a group frequently involved in conservation and natural resource utilization activities, play a strategic role in preserving birds. Table 4 shows variations in women's perceptions of bird conservation based on educational level, ranging from Junior High School (SLTP), Senior High School (SLTA), Diploma, to Bachelor's degree.

**Table 4.** Women's perceptions of bird conservation based on education level

No.	Level of education	Score Value	Perception Category
1	Junior High School (SLTP)	104.54	Good
2	Senior High School (SLTA)	104.08	Good
3	Diploma	104.50	Good
4	Bachelor	108.55	Very good

The table shows that women's perceptions of bird conservation vary based on their level of education. Women with a Bachelor's degree (S1) obtained the highest perception score (108.55), which is included in the 'Excellent' category. In contrast, women with junior high school (SLTP), high school (high school), and diploma education had scores that were included in the 'Good' category, with scores ranging from 104.08 to 104.54. These findings suggest that higher levels of education may be related to a more positive perception of bird conservation, highlighting the important role of education in raising environmental awareness and conservation efforts among women.

### 3.2 Discussion

The findings of this study demonstrate a clear relationship between women's educational attainment and their perceptions of bird conservation, with higher levels of education consistently associated with more positive and informed attitudes. Women with primary education tend to exhibit lower levels of awareness and less favorable perceptions of bird conservation, which can largely be attributed to limited access to environmental information and insufficient understanding of ecological processes. Prior research supports this pattern, indicating that lower educational attainment is often linked to reduced environmental awareness and engagement (Martha et al., 2025; Yusof et al., 2025). As education progresses to the secondary level, perceptions improve due to increased exposure to basic ecological concepts and biodiversity issues. However, environmental literacy at this stage remains suboptimal, suggesting that existing curricula do not yet fully integrate effective environmental education (Napitupulu et al., 2025; Pangestu et al., 2023; Paryanti et al., 2021).

Women with secondary education generally demonstrate moderately positive perceptions of bird conservation, although these remain lower than those observed among highly educated individuals. This group typically possesses foundational knowledge of conservation but lacks exposure to more complex environmental issues and practical engagement opportunities. Social and cultural constraints further limit their participation, as women in this category are often more involved in domestic responsibilities and less engaged in formal conservation initiatives. Gender norms restricting women's roles in public and environmental spheres also contribute to this disparity (Trelohan, 2022). Consequently, education not only enhances knowledge but also influences access to participation and empowerment in conservation activities.

In contrast, women with higher education exhibit significantly more favorable perceptions of bird conservation, often categorized as "very good." Higher education fosters critical thinking, ecological awareness, and a deeper understanding of environmental interdependencies, all of which contribute to stronger pro-environmental attitudes and behaviors (Hoffmann & Muttarak, 2020). Empirical studies across different contexts confirm that highly educated women are more likely to support conservation initiatives, participate in environmental organizations, and contribute financially to conservation programs (Sun et al., 2023; Liu et al., 2021; Tan et al., 2023a). Their engagement is often reinforced by

direct experiences such as birdwatching and ecotourism, which enhance both awareness and appreciation of biodiversity. Furthermore, higher education strengthens emotional connections to nature and increases sensitivity toward ecological issues, positioning women as key actors in conservation efforts.

The role of education extends beyond knowledge acquisition to shaping access to information, social networks, and opportunities for active involvement. Women with higher educational attainment are more likely to engage with diverse information sources, including scientific literature, digital media, and environmental organizations, thereby reinforcing their conservation awareness. As shown in Table 5, perceptions of bird conservation increase proportionally with education level, highlighting education as a critical determinant of environmental attitudes. Integrating environmental education into both formal and informal learning systems is therefore essential to enhance women's participation and effectiveness in conservation initiatives.

Perception itself is a complex construct influenced by individual experiences, cultural values, and social contexts. It encompasses how individuals interpret and respond to environmental phenomena, including wildlife and conservation issues (Chen-Xia et al., 2023; Goyal & De Keersmaecker, 2022; Lopes-Rafegas et al., 2023). In this study, women's overall perception of birds in urban environments was categorized as "very good," indicating a strong baseline appreciation for avian biodiversity. This positive perception reflects the potential of women to act as influential agents in conservation education, particularly within families and communities where they often play central roles in knowledge transmission and value formation.

Despite these encouraging findings, several structural and social barriers continue to limit women's full participation in conservation. These include time constraints, domestic responsibilities, limited access to resources, and persistent gender biases within conservation institutions (James et al., 2023; Sommerville et al., 2022). Addressing these barriers requires the development of gender-responsive conservation programs that acknowledge women's specific needs and roles. Without such considerations, conservation initiatives risk excluding a critical segment of the population whose involvement is essential for long-term sustainability.

The study also highlights that women generally perceive birds as valuable components of urban ecosystems, contributing both ecological and psychological benefits. Birds are recognized as indicators of environmental health and as agents of natural pest control, while their presence enhances aesthetic value and emotional well-being. Positive interactions with birds, such as feeding or observing them, further strengthen favorable perceptions. Access to green spaces plays a crucial role in facilitating these interactions, as urban environments that support bird habitats promote both biodiversity and human well-being (Hepburn et al., 2021; Lerman et al., 2021; Yang et al., 2020).

Women's contributions to bird conservation extend beyond perception to active engagement in various activities, including environmental education, habitat management, and community-based conservation initiatives. Their involvement often integrates social, cultural, and ecological dimensions, resulting in more holistic and sustainable conservation approaches. For instance, women frequently act as informal educators, transmitting ecological knowledge across generations and fostering environmental stewardship within communities. Studies have shown that conservation programs involving women tend to be more effective due to their collaborative and community-oriented nature (Almuna et al., 2022).

Furthermore, women's roles in conservation are deeply embedded in socio-cultural contexts. In many communities, women maintain traditional ecological knowledge related to bird behavior, migration patterns, and habitat requirements, which complements scientific approaches and enhances conservation outcomes (Acevedo-Ortiz et al., 2024). However, despite their significant contributions, women remain underrepresented in leadership and decision-making positions within conservation organizations, reflecting persistent structural inequalities. Addressing this "leaky pipeline" requires institutional support, gender-inclusive policies, and targeted capacity-building initiatives (Sato et al., 2021).

Age and life experience also influence women's perceptions of bird conservation. The findings indicate that adult women exhibit more positive perceptions compared to younger groups, supporting the ecological maturity theory, which suggests that environmental awareness increases with age and experience (Straka et al., 2025). This underscores the importance of tailoring conservation education strategies to different age groups. For younger audiences, technology-based approaches such as mobile applications and interactive media may be more effective, while community-based and experiential learning approaches are better suited for adults.

Importantly, bird conservation should be understood not only as an ecological issue but also as a socio-cultural and economic one. Women play a central role in linking these dimensions through activities such as sustainable tourism, handicrafts, and local environmental initiatives. Empowering women economically can therefore create synergistic benefits for both conservation and community development (Simarmata et al., 2023). Successful examples, such as community-based conservation movements led by women, demonstrate that inclusive approaches can significantly enhance conservation outcomes while promoting social equity.

In conclusion, this study underscores the critical role of education in shaping women's perceptions and participation in bird conservation. Higher education levels are associated with stronger environmental awareness, greater engagement, and more positive attitudes toward conservation. However, education alone is insufficient without addressing the structural and socio-cultural barriers that limit women's involvement. A comprehensive approach that integrates gender-responsive policies, inclusive education, and community-based strategies is essential to maximize women's contributions to biodiversity conservation. Recognizing and empowering women as key stakeholders is not only a matter of equity but also a strategic imperative for achieving sustainable conservation outcomes in the face of ongoing environmental challenges.

#### 4. CONCLUSION

This study shows that women's perception of bird conservation is influenced by their level of education. Women with a Bachelor's degree (S1) have very good perceptions, while groups with lower education, such as junior high schools, high schools, and diplomas, tend to have good perceptions. These findings indicate that formal education has an important role to play in raising environmental awareness, especially in bird conservation efforts. Therefore, the practical implications of these findings are the need to integrate more intensive environmental education programs into school curricula as well as community programs that focus on conservation and preservation of nature. However, the study was limited in terms of the sample being limited to women only, so the results could not be generalized to the entire population. Further research is recommended to involve a more diverse sample, including males and different age groups, as well as to delve deeper into other factors that influence public perceptions of bird conservation.

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