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Journal of Threatened Taxa

10.11609/jott.2026.18.5.28739-29002

www.threatenedtaxa.org

26 May 2026 (Online & Print)

18(5): 28739-29002

ISSN 0974-7907 (Online)

ISSN 0974-7893 (Print)



Open Access





ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

Publisher
Wildlife Information Liaison Development Society
www.wild.zooreach.org

Host
Zoo Outreach Organization
www.zooreach.org

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Cover: Oil painting of Humpback Whale *Megaptera novaeangliae*. © R. Mahesh.



Avifaunal diversity in agroecosystems: a case study from Uttar Pradesh, India

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Abstract: Birds play a crucial role as indicators of environmental health, making them valuable for conservation assessments. This study presents a systematic checklist of bird species composition, diversity patterns, and foraging guild structures in the Nautanwa agroecosystem of Maharajganj District, Uttar Pradesh. Field surveys were conducted using the point count method across agricultural fields, human settlements, rivers, and wetlands between April and May 2022. A total of 52 bird species, spanning 47 genera, 28 families, and 13 orders, were recorded. Passeriformes emerged as the dominant order, while Ardeidae and Sturnidae were the most represented families. The overall bird density was ~12 individuals per ha, with the highest density in human habitats and the lowest in agricultural fields, indicating the influence of habitat heterogeneity on avian abundance. Diversity and richness indices were highest in river habitats and lowest in wetlands, underscoring the importance of habitat mosaics for supporting avian communities. Six foraging guilds were identified, with omnivores (51%) and insectivores (19%) being the most prevalent, reflecting birds' adaptability to diverse food resources in agroecosystems. The presence of two 'Vulnerable' species—the Sarus crane *Antigone antigone* and the Lesser adjutant *Leptoptilos javanicus*—and one 'Near Threatened' species highlight the conservation value of these agricultural landscapes. The findings highlight the importance of considering agroecosystems in broader conservation strategies and emphasize the need for continued monitoring to protect vulnerable bird species in these dynamic environments.

Keywords: Birds, conservation, density, feeding guilds, insectivorous, point count, richness, status, vulnerable, wetlands.

Editor: S. Balachandran, Bombay Natural History Society, Mumbai, India.

Date of publication: 26 May 2026 (online & print)

Citation: Khan, F. & K. Ahmed (2026). Avifaunal diversity in agroecosystems: a case study from Uttar Pradesh, India. *Journal of Threatened Taxa* 18(5): 28900–28910. <https://doi.org/10.11609/jott.9973.18.5.28900-28910>

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Funding: Self-funded.

Competing interests: The authors declare no competing interests.

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Author contribution: FK: field work, first manuscript draft. KA: conceptualization, supervision, evaluation, editing and proof reading

Acknowledgments: The authors thank the Department of Wildlife Sciences for providing basic facilities during the field study and report writing.



INTRODUCTION

India is home to many habitats and ecosystems, with a rich diversity of plants and animals. The agricultural frontier has rapidly expanded due to the growth of human populations (Velásquez et al. 2021) and one of the most frequent land-use changes has been the conversion of natural ecosystems to agricultural fields (Barral et al. 2015). Agricultural areas cover nearly 37% of the terrestrial surface of Earth, and provide many ecosystem services and is influenced by anthropogenic activities and natural cycles (FAO 2025).

Birds are key indicators of environmental conditions and are pivotal in conserving threatened vertebrates (Ikin et al. 2016). Birds are versatile in their ecological adaptations and respond swiftly to habitat changes. They are easily monitored and play crucial ecological roles such as seed dispersal, pest control, and pollination (Wenny et al. 2011). Agricultural landscapes provide a focused and predictable supply of bird food (Kumar & Sahu 2020). This food includes seeds, grains, fruits, grasses, weeds, arthropods, and rodents (Asokan et al. 2009).

Agriculturists benefit from birds as natural pest control agents, consuming harmful insects and pests within the agroecosystem (Dhindsa & Saini 1994; Bianchi et al. 2006; Asokan et al. 2010; Narayana et al. 2019). Although agriculture covers approximately 60.45% of the total land area (Anonymous 2021a), conservation efforts are concentrated on natural forests or protected areas, despite the global protected area coverage being only 15.40% (Anonymous 2021b). Agricultural ornithology studies in India have been limited, with a major focus on vulnerable species (Mukherjee et al. 2002). There is a growing shift towards conservation outside protected areas, acknowledging the significant impact of agricultural landscapes on bird habitats, as explored in research addressing habitat loss, fragmentation, and avifauna changes (Brock & Jarman 2000; Mac Nally et al. 2000; Woinarski et al. 2000).

Although less than 1% of the world's bird species are primarily associated with agricultural habitats, nearly one-third of all bird species use these landscapes at least occasionally (Sekercioglu et al. 2007). Such species play a crucial role in agroecosystems by providing key ecosystem services, including pest control, pollination, seed dispersal, and nutrient deposition (Sekercioglu 2006). Therefore, documenting and monitoring species assemblages in agroecosystems are essential for understanding birds' habitat and resource use in providing ecosystem services. This will also help

in understanding of the changes in bird ecosystem services and ecological function in agricultural areas as a result of the declines or increases in predators, seed dispersers, pollinators, and other avian functional groups (Sekercioglu 2012).

Bird diversity in agricultural areas has been studied by many authors in different parts of India: Assam (Ahmed & Dey 2014; Gogoi et al. 2023), Chhattisgarh (Yashmita-Ulman et al. 2017), Haryana (Kiran et al. 2022; Kumar & Sahu 2020), Karnataka (Basavarajappa 2006; Athreya et al. 2010), Maharashtra (Abdar 2014), Punjab (Malhi 2006; Kler & Manoj 2015; Kaur & Sidhu 2022; Kler et al. 2022), Tamil Nadu (Jayasimhan & Padmanabhan 2019), Telangana (Narayana et al. 2019), and West Bengal (Hossain & Aditya 2016). Several studies have also been conducted in Uttar Pradesh agroecosystems (Iqbal et al. 2003; Sundar 2006; Sundar & Kittur 2012); few studies have focused on eastern Uttar Pradesh (Yashmita-Ulman & Singh 2021). It is hypothesized that the heterogeneous agricultural habitats of the Terai region support a high diversity of avifauna with distinct foraging guild structures, and that variations in crop composition, vegetation cover, and resource availability influence species composition and distribution within the agroecosystem. The present study addresses this gap by documenting species composition, diversity patterns, and foraging guild structure of avifauna in the Nautanwa agricultural landscape of Maharajganj District, Uttar Pradesh, thereby highlighting the ecological importance of Terai agroecosystems.

Study area

The town of Nautanwa, situated in the Maharajganj district of Uttar Pradesh, India, with geographical coordinates of around 27.424° N and 83.427° E (Figure 1). Nestled in the Terai region at the foothills of the Shivalik Himalaya, it has an average elevation of 89 m.

The study site consists of approximately 259 villages (Census of India 2011). The region experiences an oppressive, partly cloudy wet season and a mostly clear, hot dry season, with annual temperatures typically ranging 11–37 °C, and rare extremes below 8 °C or above 41 °C (Weather Spark 2024). The Danda Stream and Rohini River serve as the main water sources (Central Ground Water Board 2013). Agriculturally, Nautanwa follows the cultivation of Kharif and Rabi crops. The town hosts a variety of tree species, including Ashoka *Saraca asoca*, Neem *Azadirachta indica*, Shisham *Dalbergia sissoo*, Peepal *Ficus religiosa*, Burflower *Neolamarckia cadamba*, Banyan *Ficus benghalensis*, Eucalyptus *Eucalyptus grandis*, and Babool *Vachellia nilotica*. The

fauna includes Indian Grey Mongoose *Urva edwardsii*, Asian Palm Civet *Paradoxurus hermaphroditus*, Golden Jackal *Canis aureus*, and Indian Fox *Vulpes bengalensis* (Fatima Khan pers. obs. 2022).

METHODS

Sampling sites were strategically selected across the diverse study area, including agriculture, human habitats, rivers, and wetlands. Bird surveys were conducted using point-count method (Ahmed 2010) from April to May 2022. Point count surveys were conducted by establishing an imaginary circular plot, with the observer positioned at the center. The observer recorded all detections in every direction for a fixed duration of 10 minutes (Persulesy & Putuhena 2020). During the survey, birds were sampled by monitoring 50 permanently established points. Each point was surveyed twice, resulting in a total sampling effort of 100 point counts. Surveys were conducted in the morning hours (0600–1030 h). The birds were recorded in a 50-m radius from the point count to cover maximum species in the data set and points were at least 200 m apart to avoid repetitive counting of the same individual multiple

times (Ahmed et al. 2023). At every point count, a five minutes settling down time was given before recording the birds (Yashmita-Ulman & Singh 2021). On sighting the birds, the species name, number of individuals and habitat was recorded. Data on species presence on ground, stem, outer, middle or top canopy was also recorded (Ahmed 2010). Birds flying across were not counted. The opportunistic counts during the other time of the day were also included in the final checklist of birds to ensure a more comprehensive documentation of avifaunal diversity; however, these records were excluded from point count-based indices and statistical analysis. Field guides (Ali & Ripley 1987; Grimmett et al. 2011) were used for bird identification. The bird checklist was compiled following Praveen & Jayapal (2025). The species were also classified into major feeding guilds, i.e., insectivorous (I), carnivorous (C), granivorous (G), frugivorous (F), nectarivores (N), and omnivorous (O).

Analysis

Shannon-Wiener Index (H') was used for diversity and Margalef's Index (RI) for richness computations. The program DISTANCE (Thomas et al. 2010) was used to compare models, assess goodness-of-fit and determine estimates of bird density for the study period.

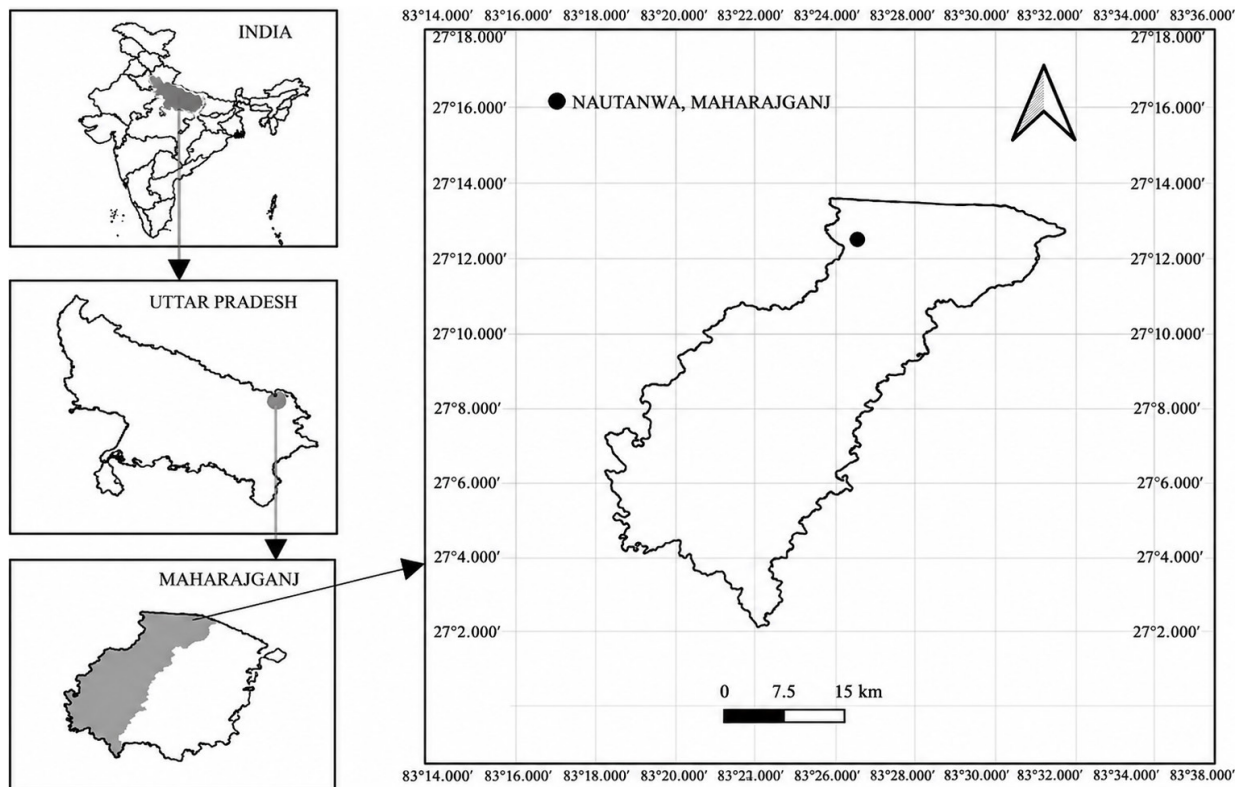


Figure 1. Map of study area of Nautanwa, Maharajganj, India.

The different models were compared using Akaike's information criteria (Anderson et al. 1998). A matrix was formed of bird species and their mean perch height and horizontal distance from trunk for each species. This data set was used to generate guilds. Single linkage cluster diagrams were generated using its nearest-neighbour method through statistical software BioDiversity Pro (McAleece et al. 1997).

RESULTS

The study recorded 52 bird species from the study area, representing 47 genera, 28 families, and 13 orders (Table 1). Among the recorded species, two were categorised as 'Vulnerable' (VU), one as 'Near Threatened' (NT), and the majority (49 species) were classified as 'Least Concern' (LC) on the IUCN Red List. Additionally, six species identified in the study are listed in Appendix II of the Convention on International Trade of Endangered Species (CITES), and 12 belong to Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

Bird density

Overall bird density in the study area was recorded as 11.74 ± 0.73 individuals per ha, with an average cluster size of 2.83 ± 2.65 . The effective strip width (EDR) for bird observations was found to be 38.01 ± 1.79 (Table 2). Notably, bird density varied across different habitats, with the highest density observed in human habitats (16.43 ± 1.42) and the lowest in agricultural fields (9.68 ± 0.73). This difference in bird densities among habitats was significant ($t = 7.52, p < 0.005$).

Passeriformes was found to be the dominant order, encompassing 12 families and 22 species, followed by Pelecaniformes with one family and five species, while Strigiformes and Bucerotiformes are the least prevalent orders, each represented by one family and one species; the observed variation in order percentages in the study area was found to be significant ($t = 2.61, df = 12, p < 0.05$) (Table 3).

Among the 28 families recorded, Ardeidae and Sturnidae were identified as dominant, each with four species. This observed difference in dominance between these two families was found to be significant ($t = 10.55, df = 27, p < 0.05$) (Table 3).

Species diversity and richness

The study site's overall avian diversity and richness were found to be 4.39 and 13.74, respectively. Among

diverse habitats, the river habitat showed the highest species richness (16.25) and diversity (4.13), while the wetland exhibited the lowest values (Figure 2). Analyzing various avian orders, Passeriformes demonstrated the highest species richness (27.12) and diversity (4.95), whereas Bucerotiformes exhibited the lowest (Figure 3). At the family level, Corvidae showed the highest species richness (10.79) and diversity (3.84), with the lowest values found in the family Strigidae (Figure 4).

Guild structure

Six foraging guilds were identified in the study site, with omnivores (O) being the most represented (27 species, 51%), followed by insectivores (I) (10 species, 19%), and nectarivores (N) being the least represented (one species, 1%) (Figure 5). A cluster analysis categorised the species into three distinct clusters (Figure 6).

Cluster 1 comprises species that typically forage on the ground, including, Little Egret *Egretta garzetta*, Cattle egret *Bubulcus ibis*, Red-wattled Lapwing *Vanellus indicus*, and White-breasted Waterhen *Amaurornis phoenicurus*. Cluster 2 includes species that share habitats characterised by open country in the plains with trees, wires, or other perches. Birds that belong to this cluster includes the House Crow *Corvus splendens*, Large-billed Crow *Corvus macrorhynchos*, Jungle Babbler *Argya striata*, Black Drongo *Dicrurus macrocercus*, Indian Pond Heron *Ardeola grayii*, and White-throated Kingfisher *Halcyon smyrnensis*. Cluster 3 consists of species that share the same stratum, whether found on the lower, middle, or top levels. This cluster includes Common Myna *Acridotheres tristis*, Bank Myna *Acridotheres ginginianus*, and Red-whiskered Bulbul *Pycnonotus jocosus*. Black Kite predominantly occupies the top canopy, mostly flying, even feeding on prey while airborne.

DISCUSSION

The present study offers a detailed assessment of avifaunal diversity in the Nautanwa agricultural landscape of Maharajganj District, Uttar Pradesh, and contributes baseline data for understanding the ecological role of agroecosystem in supporting bird communities. The documentation of 52 bird species, spanning 47 genera, 28 families, and 13 orders, with Passeriformes as the dominant order, highlights the ecological richness and complexity of this agroecosystem. In line with the broader trend in India, Passeriformes emerged as the most dominant order (Praveen et al. 2016). This order

Table 1. Checklist of bird species along with their conservation status recorded in the study area.

	Order	Family	Common name	Scientific name	Red List	CITES	CMS	Feeding guild
1	Columbiformes	Columbidae	Rock Pigeon	<i>Columba livia</i>	LC			G
2		Columbidae	Laughing Dove	<i>Streptopelia senegalensis</i>	LC			G
3		Columbidae	Spotted Dove	<i>Streptopelia chinensis</i>	LC			G
4	Cuculiformes	Cuculidae	Greater Coucal	<i>Centropus sinensis</i>	LC			O
5		Cuculidae	Asian Koel	<i>Eudynamis scolopacea</i>	LC			F
6	Gruiformes	Rallidae	Common Moorhen	<i>Gallinula chloropus</i>	LC			O
7		Rallidae	White-Breasted Waterhen	<i>Amaurornis phoenicurus</i>	LC			O
8		Rallidae	Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>	LC			O
9		Gruidae	Sarus Crane	<i>Antigone antigone</i>	VU	II	II	O
10	Charadriiformes	Charadriidae	Red-wattled Lapwing	<i>Vanellus indicus</i>	LC		II	O
11		Jacaniidae	Bronze-winged Jacana	<i>Metopidius indicus</i>	LC			O
12		Scolopacidae	Common Sandpiper	<i>Actitis hypoleucos</i>	LC		II	O
13	Ciconiiformes	Ciconiidae	Asian Openbill	<i>Anastomus oscitans</i>	LC			O
14		Ciconiidae	Lesser Adjutant	<i>Leptotilos javanicus</i>	VU			O
15	Suliformes	Phalacrocoracidae	Little Cormorant	<i>Microcarbo niger</i>	LC			O
16		Phalacrocoracidae	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	LC			O
17	Pelecaniformes	Ardeidae	Intermediate Egret	<i>Ardea intermedia</i>	LC			O
18		Ardeidae	Little Egret	<i>Egretta garzetta</i>	LC			O
19		Ardeidae	Eastern Cattle-Egret	<i>Ardea coromanda</i>	LC			O
20		Ardeidae	Indian Pond-Heron	<i>Ardeola grayii</i>	LC			O
21		Threskiornithidae	Red-naped Ibis	<i>Pseudibis papillosa</i>	LC			O
22	Accipitriformes	Accipitridae	Black-winged Kite	<i>Elanus caeruleus</i>	LC	II	II	C
23		Accipitridae	Black Kite	<i>Milvus migrans</i>	LC	II	II	C
24	Strigiformes	Strigidae	Spotted Owlet	<i>Athene brama</i>	LC	II		C
25	Bucerotiformes	Upupidae	Eurasian Hoopoe	<i>Upupa epops</i>	LC			O
26	Coraciiformes	Alcedinidae	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	LC			O
27		Alcedinidae	Pied Kingfisher	<i>Ceryle rudis</i>	LC			O
28		Meropidae	Asean Green Bee-eater	<i>Merops orientalis</i>	LC			I
29	Psittaciformes	Psittaculidae	Alexandrine Parakeet	<i>Psittacula eupatria</i>	NT	II		G
30		Psittaculidae	Rose-ringed Parakeet	<i>Psittacula krameri</i>	LC			G
31	Passeriformes	Dicruridae	Black Drongo	<i>Dicrurus macrocercus</i>	LC			I
32		Corvidae	Rufous Treepie	<i>Dendrocitta vagabunda</i>	LC			F
33		Corvidae	House Crow	<i>Corvus splendens</i>	LC			O
34		Corvidae	Large-billed Crow	<i>Corvus macrorhynchos</i>	LC			O
35		Cisticolidae	Ashy Prinia	<i>Prinia socialis</i>	LC	II		I
36		Cisticolidae	Zitting Cisticola	<i>Cisticola juncidis</i>	LC		II	I
37		Cisticolidae	Common Tailorbird	<i>Orthotomus sutorius</i>	LC		II	I
38		Pycnonotidae	Red-vented Bulbul	<i>Pycnonotus cafer</i>	LC			F
39		Pycnonotidae	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	LC			F
40		Leiothrichidae	Jungle Babbler	<i>Argya striata</i>	LC		II	I
41		Sturnidae	Indian Pied Starling	<i>Gracupica contra</i>	LC			O
42		Sturnidae	Brahminy Starling	<i>Sturnia pagodarum</i>	LC			O
43		Sturnidae	Common Myna	<i>Acridotheres tristis</i>	LC			O

	Order	Family	Common name	Scientific name	Red List	CITES	CMS	Feeding guild
44		Sturnidae	Bank Myna	<i>Acridotheres ginginianus</i>	LC			O
45		Muscicapidae	Oriental Magpie-Robin	<i>Copsychus saularis</i>	LC		II	I
46		Muscicapidae	Brown Rock Chat	<i>Oenanthe fusca</i>	LC		II	I
47		Nectariniidae	Purple Sunbird	<i>Cinnyris asiaticus</i>	LC			N
48		Estrildidae	Red Munia	<i>Amandav aamandava</i>	LC			G
49		Estrildidae	Scaly-breasted Munia	<i>Lonchura punctulata</i>	LC			G
50		Passeridae	House Sparrow	<i>Passer domesticus</i>	LC			G
51		Motacillidae	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	LC		II	I
52		Motacillidae	Paddyfield Pipit	<i>Anthus rufulus</i>	LC		II	I

LC—Least Concern | NT—Near Threatened | VU—Vulnerable | C—Carnivorous | F—Frugivorous | G—Granivorous | I—Insectivorous | O—Omnivorous | N—Nectarivorous | CITES—Convention on International Trade in Endangered Species of Wild Fauna and Flora | CMS—Convention on the Conservation of Migratory Species of Wild Animals.

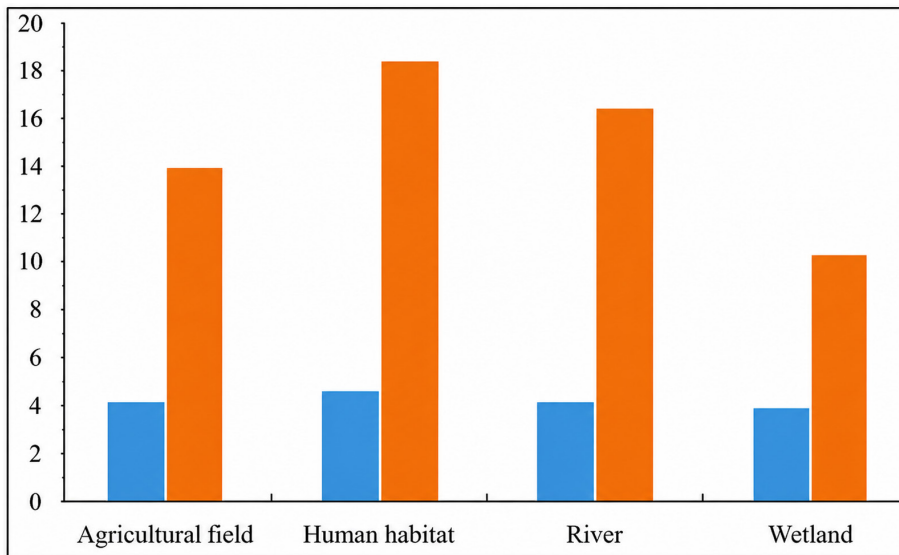


Figure 2. Habitat-wise diversity and richness of birds found in the study area.

was observed to be the most dominant in the study area, represented by 11 families. The dominance of Passeriformes is also consistent with findings from other Indian agricultural landscapes, such as those reported by Kumar & Sahu (2020) in Haryana and Hossain & Aditya (2016) in West Bengal, where Passeriformes also represented the largest proportion of the avifaunal community.

From the overall bird density, the highest density was found in human habitats and the lowest in agricultural fields which highlights the influence of habitat heterogeneity and human-modified environments on avian abundance. This pattern is in line with studies by Mukhopadhyay & Mazumdar (2017) and Chaube et al. (2018), who found that areas with greater structural

complexity, such as those near human settlements or with a mix of trees, water bodies, and open fields, tend to support higher bird densities. Such habitat diversity in this area is crucial in supporting relatively high species richness (Mukhopadhyay & Mazumdar 2017). The relatively lower density in agricultural fields may be attributed to intensive farming practices, reduced vegetation cover, and limited availability of nesting and foraging sites, as also observed by Power (2010) and Barral et al. (2015) in agroecosystem studies.

The diversity (4.39) and richness (13.74) values observed in this study are comparable to those reported in other Indian agricultural and semi-urban landscapes, such as the Banda University of Agriculture and Technology Campus (Singh et al. 2018) and Haiderpur

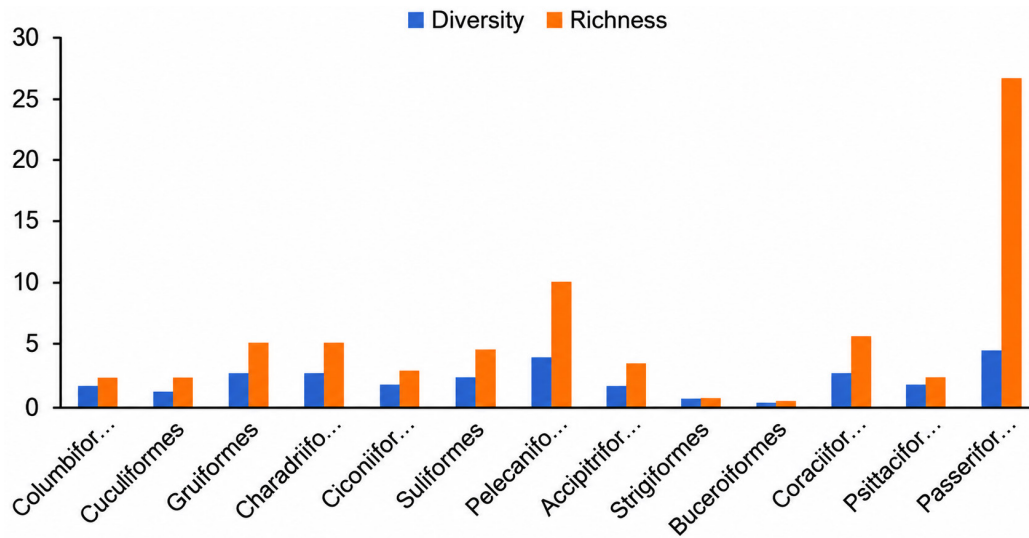


Figure 3. Diversity and richness of different orders found in the study area.

Table 2. Variation of bird density (D/ha), effective strip width (EDR), and average cluster size A(S) across different habitats.

Habitat	DS ± SE	95% CL	EDR ± SE	95% CL	A(S) ± SE	95% CL
Human habitat	16.43 ± 1.42	15.94–16.98	30.72 ± 6.27	27.14–34.79	7.09 ± 0.79	6.3–7.88
River	11.09 ± 1.31	10.51–11.67	45.19 ± 3.68	38.48–53.08	1.60 ± 0.56	0.81–3.17
Agricultural field	9.68 ± 0.73	1.52–20.88	36.27 ± 1.67	33.07–39.77	3.28 ± 0.40	2.50–4.19
Wetland	10.03 ± 1.64	8.45–11.61	4.81 ± 1.61	41.72–48.12	2.38 ± 0.76	1.27–4.47
Overall	11.74 ± 0.73	11.01–12.47	38.01 ± 1.79	34.65–41.70	2.83 ± 2.65	0.18–5.48

Wetland (Joshi et al. 2021). The highest species richness and diversity in river habitats, and the lowest in wetlands, further emphasize the importance of maintaining a mosaic of habitat types within the agroecosystem. This is attributed to the presence of water and strategically planted patch trees along the bounds, exerting a positive influence on bird diversity. The ecosystem’s health is underscored by factors such as local abundance of food resources, appropriate water levels, and a well-structured habitat (Saygili et al. 2011). Wetland factors such as water level, size, habitat changes, and plant species also shape the diversity and richness of birds in this environment (Woldemariam et al. 2018).

The identification of six foraging guilds, with omnivores being the most represented (51%), followed by insectivores (19%), reflects the adaptability of birds to the diverse food resources available in agroecosystems. This is consistent with studies by Mukhopadhyay & Mazumdar (2017) who also found omnivorous and insectivorous birds to dominate in agricultural and suburban landscapes. The prevalence of omnivores suggests that these birds can exploit a wide

range of food sources, including seeds, grains, insects, and anthropogenic waste, which may be abundant in agricultural and human-modified habitats. Insectivorous birds, on the other hand, play a crucial role in natural pest control, as highlighted by Asokan et al. (2009, 2010) and Bianchi et al. (2006), who documented the ecosystem service value of birds in regulating insect populations in crop fields. Black Kite *Milvus migrans* and House Sparrow *Passer domesticus* did not group into any cluster and were identified as outliers due to their unique foraging behaviour.

The finding of two VU species, the Sarus Crane *Antigone antigone* and Lesser Adjutant *Leptoptilos javanicus*, as well as one NT species, highlights the conservation value of the agroecosystem. This finding is supported by Mukherjee et al. (2002) and Sundar & Subramanya (2010), who emphasized the importance of rice fields and agricultural habitats for the survival of threatened waterbirds in India. The presence of species listed in CITES and CMS appendices further highlights the international conservation relevance of these habitats. These findings highlight the significance

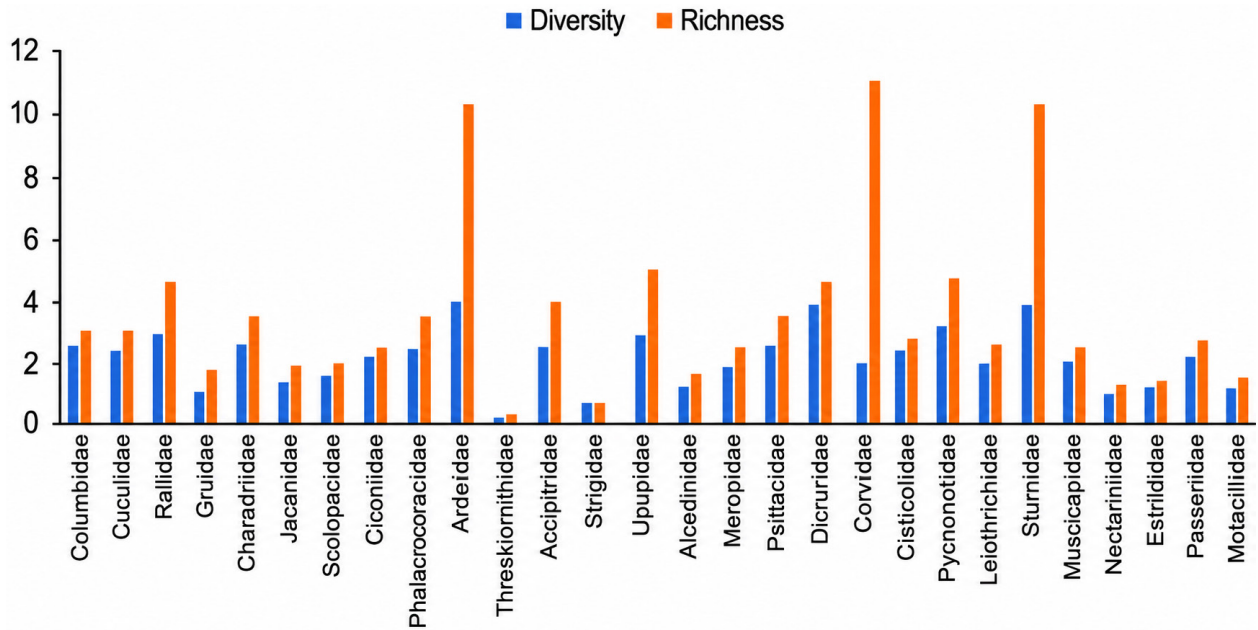


Figure 4. Diversity and richness of different families found in the study area.

Table 3. Percentage of orders and families of birds recorded from the study area.

	Order	%	Family	%
1	Columbiformes	5.76	Columbidae	5.76
2	Cuculiformes	3.84	Cuculidae	3.84
3	Gruiformes	7.69	Rallidae	5.76
4			Gruidae	1.92
5	Charadriiformes	5.76	Charadriidae	1.92
6			Jacanidae	1.92
7			Scolopacidae	1.92
8	Ciconiiformes	3.84	Ciconiidae	3.84
9	Suliformes	3.84	Phalacrocoracidae	3.84
10	Pelecaniformes	9.61	Ardeidae	7.69
11			Threskiornithidae	1.92
12	Accipitriformes	3.84	Accipitridae	3.84
13	Strigiformes	1.92	Strigidae	1.92
14	Bucerotiformes	1.92	Upupidae	1.92
15	Coraciiformes	5.76	Alcedinidae	3.84
16			Meropidae	1.92
17	Psittaciformes	3.84	Psittacidae	3.84
18	Passeriformes	42.3	Dicruridae	1.92
19			Corvidae	5.76
20			Cisticolidae	5.76
21			Pycnonotidae	3.84
22			Leiothrichidae	1.92
23			Sturnidae	7.69
24			Muscicapidae	3.84
25			Nectariniidae	1.92
26			Estrildidae	3.84
27			Passeridae	1.92
28			Motacillidae	3.84

of continuous monitoring efforts and further research to comprehensively understand and address the dynamic interactions within bird populations in the region for formulating effective conservation strategies.

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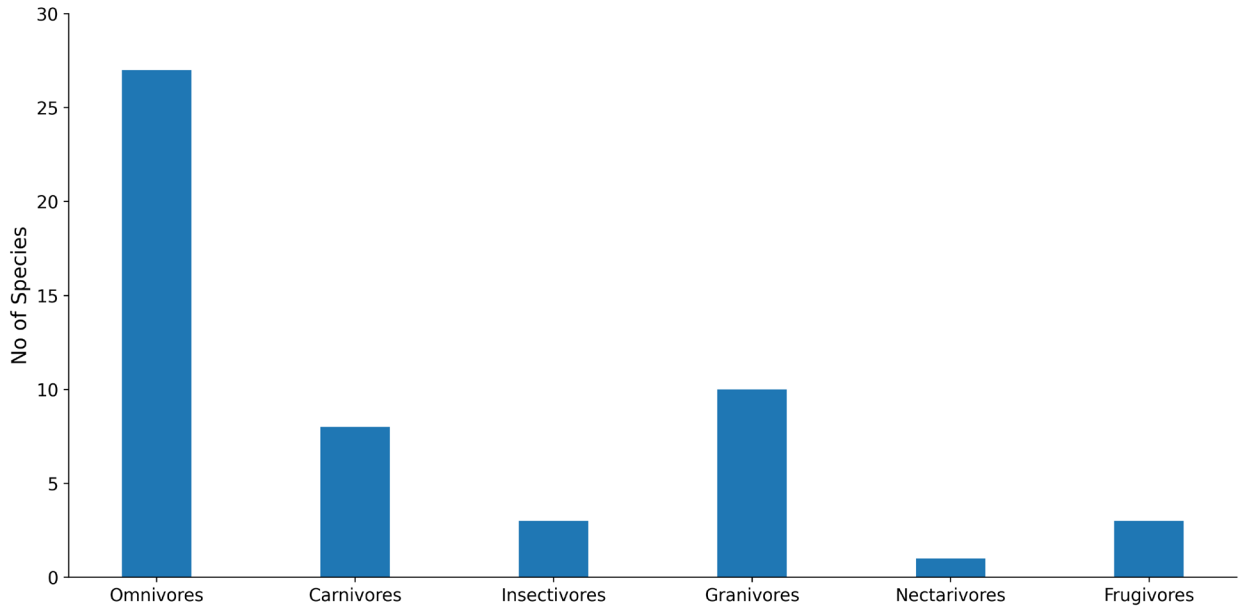


Figure 5. Number of bird species recorded under different feeding guilds in the study area.

Bay-Outts Cluster Analysis (Single Link)

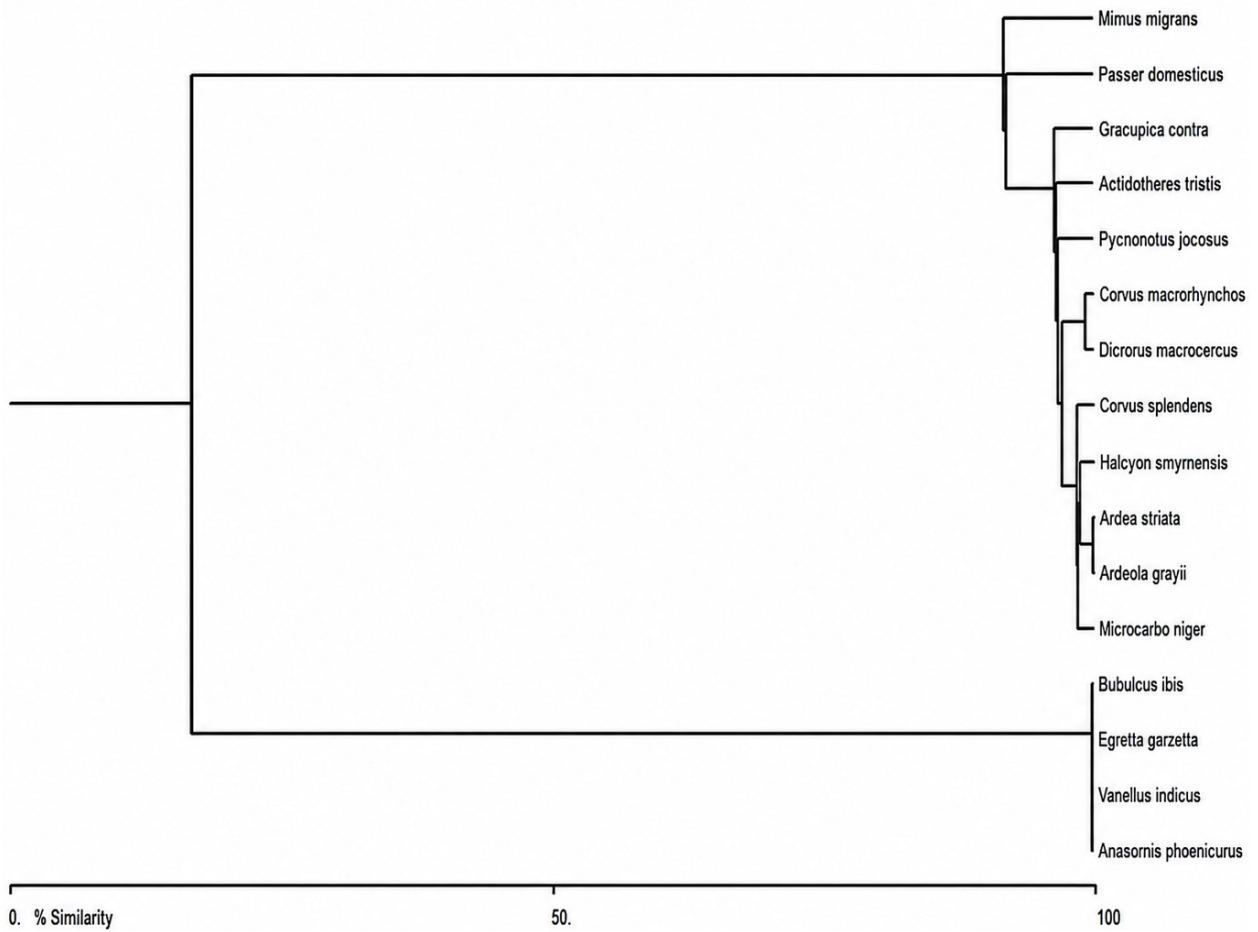


Figure 6. Cluster of birds based on feeding niche in the study area.

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Journal of Threatened Taxa is indexed/abstracted in Bibliography of Systematic Mycology, Biological Abstracts, BIOSIS Previews, CAB Abstracts, EBSCO, Google Scholar, Index Copernicus, Index Fungorum, JournalSeek, National Academy of Agricultural Sciences, NewJour, OCLC WorldCat, SCOPUS, Stanford University Libraries, Virtual Library of Biology, Zoological Records.

NAAS rating (India) 5.64

Print copies of the Journal are available at cost. Write to:
The Managing Editor, JoTT,
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3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore,
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ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

May 2026 | Vol. 18 | No. 5 | Pages: 28739–29002

Date of Publication: 26 May 2026 (Online & Print)

DOI: 10.11609/jott.2026.18.5.28739-29002

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