



ISSN 2347-2677

www.faunajournal.com

IJFBS 2020; 7(2): 16-23

Received: 05-01-2020

Accepted: 10-02-2020

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A checklist of birds in agricultural landscapes of Aligarh, Uttar Pradesh, India

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Abstract

We carried out a survey to prepare a checklist of birds across agricultural landscape of Aligarh district, Uttar Pradesh, India. 146 species belonging to 49 families of 17 orders were recorded. Maximum numbers of species belong to the families Accipitridae and Muscicapidae (10 each). 29% of the recorded species have a decreasing population trend while that of 12% of the species is unknown. Only one species (Egyptian Vulture) is endangered according to IUCN, while the number of near threatened and vulnerable species is six each. We ranked the species according to their encounter rate and found that only three species are abundant while 72 of them are rare. The present study is expected to give direction to future studies on various aspects of avian ecology across agricultural landscapes.

Keywords: Avian ecology, agricultural landscape, encounter rate, abundance scale, relative diversity, population trend

1. Introduction

India is home to around eight percent of all recorded species, which include over 45,000 plant species and 91,000 animal species (FAO, n.d.). The number of avian species in India is 1306, comprising of approximately 12.5% of the world's avifauna (Praveen, Jayapal, & Pittie, 2018) [20]. This makes it among the top ten countries of the world in terms of number of avian species (Praveen, Jayapal, & Pittie, 2016) [19]. The climate of India varies from humid and dry tropical in the south to temperate alpine in the northern parts and has a great diversity of ecosystems. Around 50-60% of India's total land area comes under agriculture (World Bank, n.d.). Agroecosystems are crucial for the survival of a large number of avian species, both resident and migratory (Dhindsa & Saini, 1994) [6]. The vast expanse of agricultural lands serves as stopovers for different migratory birds. There are, however, mixed opinions about the benefits of agroecosystems on birds (Sundar & Subramanya, 2010) [10]. Although there are reports of monitoring farmland birds in some parts of the world in order to understand the avian community dynamics thereof (Keenleyside *et al.* 2006; Stanton *et al.* 2018) [25] but such monitoring programs are scanty, given the area under agriculture, in the Indian subcontinent. Some studies have been reported like Dhindsa & Saini (1994) [6], Hossain & Aditya, (2016) [14], (Mukhopadhyay & Mazumdar, 2018) [18], Samson *et al.* (2018) [23], Sundar & Subramanya (2010) [10], to name a few, from India. With only 5.02% of the total land area under the protected area network ("Protected Areas of India", 2019) [21], and given the magnitude of the agroecosystems, it is important to understand the dynamics of avian communities in the latter. While some species seem to have benefitted, some others have dwindled due to agricultural expansion, due partly to change in natural habitats and partly to mechanisms used for high crop yield (Sundar & Subramanya, 2010) [10]. Prior to going ahead with detailed studies on this realm of avian ecology, the authors of the present study felt the need to prepare a checklist of birds inhabiting the agricultural landscapes of Aligarh district, Uttar Pradesh, India.

2. Materials and Methods

We carried out the present study between October 2017 and May 2018 in Aligarh district of Uttar Pradesh, India (Fig.1), located between 27° 29' N latitude to 28° 11' N latitude and 77° 29' E longitude to 78° 38' E longitude. The study area falls under the South-western semi arid agricultural zone of the National Agricultural Research Project (NARP) with wheat (*Triticum aestivum*) and bajra (*Pennisetum glaucum*) as the principally cultivated crops (Balasubramanian, 2013) [1]. Rice (*Oryza sativa*) is also cultivated in some parts of the zone.

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We selected three Intensive Study Areas, of 2.5 km x 2.5 km dimension, that is, 6.25 km² each (Fig. 2) in three agricultural landscapes. We used the fixed radius (30 m) point count method (Bibby *et al.*, 1993; Hutto *et al.*, 1986; Sutherland 2006) [15, 26] to record bird species. We placed point count stations at 250 metres interval on each ISA, that is, 121 points in each ISA totalling 363 points. At each point bird counts were carried out both in the morning and in the evening- three hours in the morning, beginning at sunrise; and two hours in the evening till sunset. As a result there were two replicas at each point, thereby making the total effort to be 363x2=726. Time spent at each point was 15 minutes and birds were recorded based on auditory cues and direct sightings (using a pair of Bushnell 10X-70x70 binoculars). The overall time spent for point counts was 15x726= 10,890 minutes =181.5

hours. We used Grimmett *et al.* (2016) [11] for bird identification. Nomenclature of species up to orders level followed the IOC (v 8.2) system of classification (Gill & Donsker, 2018) [9]. We ranked all the species based on encounter rate per 10 hours of sampling (Table 1), similar to Hadinto and Suhesti (2017) [12] and Lowen *et al.* (1996) in Bibby *et al.* (2000). We classified the recorded species on the basis of conservation status of IUCN and current population trend of IUCN. We calculated the relative diversity (RD_i) of families using the following formula (Samson *et al.*, 2018; Torre-Cuadros *et al.* 2007) [23, 17]:

$$RD_i = \frac{\text{Number of bird species in a family}}{\text{Total number of species}} \times 100$$

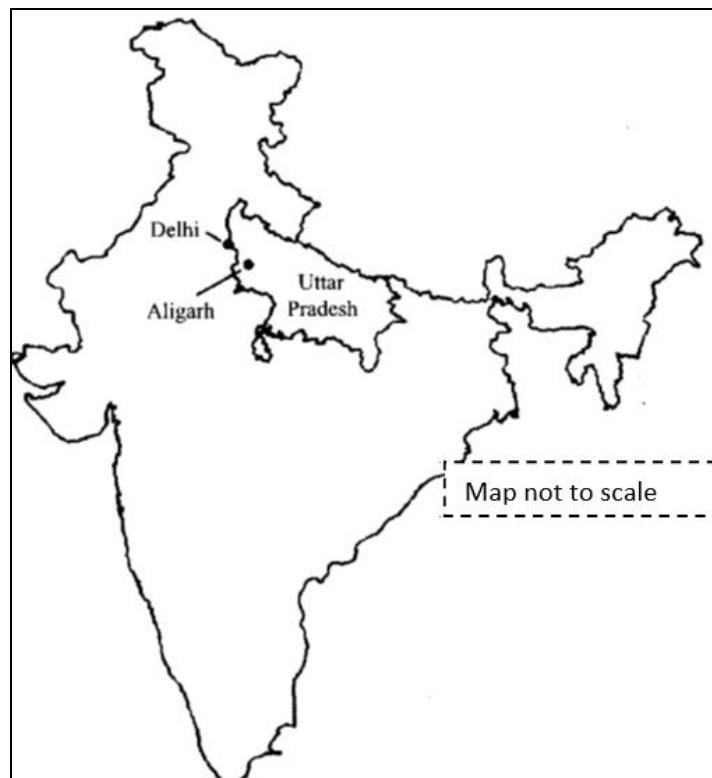


Fig 1: Location map of Aligarh district



Fig 2: Image showing locations of Intensive Study Areas

3. Results and Discussion

A total of 146 species belonging to 49 families of 17 orders

were recorded during the present study (Table 3). The order Passeriformes has the maximum number of recorded species

(n=70) while orders Anseriformes and Bucerotiformes have the lowest, with two species each (Fig.3). Passeriformes has been reported to be the most diverse order from other agricultural landscapes (Mukhopadhyay & Mazumdar, 2018; Narayana *et al.*, 2018) [18]. The families Accipitridae and Muscicapidae have the highest RDi (6.85) with 10 species each (Table 2). Muscicapidae has been reported to be the most diverse family in many protected areas (Chhangani, 2002 a & b; Samson *et al.*, 2018; Sankar *et al.*, 2006; Yaseen *et al.*, 2011) [4, 5, 23, 24, 28] and also in human-dominated landscapes (Kasambe *et al.*, 2015) [16]. However, Accipitridae has also been reported to be the most diverse in some studies (Hirangod & Lokhande, 2016; Ramesh *et al.*, 2012) [13, 22]. 91% of the recorded species belong to the least concern category of the IUCN and only one species (Egyptian Vulture) is endangered (Table 3, Fig.4). The population trend of 29% of the recorded species is decreasing (Fig.5) while that of 12% is unknown.

If we compare the above parameters with the encounter rates, it is seen that out of the total 146 species, 49.31% (n=72) of all the species fall under the rare category while only three are abundant (Fig. 6). Such a high percentage of the rare category species, although, is due to the presence of 11 winter migrants, four migratory species and five isolated records, yet the remaining 52 species under this category, which are residents, still outnumber the remaining categories significantly. Seven species of the family Accipitridae are rare while one species is uncommon and two are frequent. In terms of resident status, nine species of the family are resident and only one is a winter migrant (Besra). In Muscicapidae however, the number of rare, uncommon and frequent species is three, three and four species respectively, of which only five are resident species, three winter migrants and two isolated records. The maximum number of rare species belongs to the least concern category which include resident species like Striated grassbird, Shikra, Indian roller, Indian cuckoo, Great cormorant, Little cormorant and Indian cormorant (Fig. 7, Table 3). Five resident species *viz.* - Black-necked stork, Laggar falcon, Oriental darter, Painted stork and Red-headed falcon, with 5, 2, 1, 1 and 1 individuals sighted respectively, are near-threatened species according to IUCN and, at the same time, rare on the abundance scale.

Table 1: Ordinal scale assigned on the basis of encounter rate

Abundance category (Numbers of individuals per 10 hours of sampling)	Abundance score	Ordinal scale
<0.1	1	Rare
0.1-2.0	2	Uncommon
2.1-10.0	3	Frequent
10.1-40.0	4	Common
>40.1	5	Abundant

Two resident species *viz.* – the Indian spotted eagle and the Wolly-necked stork, with 4 and 3 individuals sighted respectively, are vulnerable according to IUCN as well as rare on the abundance scale. Among the other two vulnerable cum rare species, Hodgson's bushchat (six individuals sighted) is

an isolated record and Common pochard (five individuals sighted) is a winter migrant in our study area. The Egyptian vulture, being the only endangered species recorded, has an encounter rate of 3.8 (69 individuals sighted) and is frequent on the abundance scale.

One vulnerable species *viz.* - Sarus crane, happens to be uncommon on the abundance scale of the present study (26 individuals sighted) and one near-threatened species, the Black-headed Ibis, is uncommon on the abundance scale (20 individuals sighted). The uncommon species' list of the least concern category contains only two winter migrants, Bluethroat and Little stint, with 28 and 31 individuals sighted respectively, while the remaining 13 species are resident (with 19-36 individuals sighted).

Only one species (Blue rock pigeon), with a decreasing population trend happens to be abundant on the abundance scale (969 individuals sighted) while two other abundant species (Common myna and Pied starling) have increasing population trends (1064 and 985 individuals sighted respectively). The highest number of species with decreasing population trend belong to the rare category (Fig. 8) of the present study (n=24). These include resident species like Asian plain martin (n=7), Crested lark (n=12), Oriental White-eye (n=12) and Indian spotted eagle (n=4). The population trend of only 12 species in the rare category is increasing while that of 26 others is stable.

4. Conclusion

On the basis of the present study we may conclude that there exists a considerable need to conduct detailed studies pertaining to various aspects of avian ecology in agricultural landscapes. Birds are good ecological indicators (Bhattacharya & Roy, 2013) [2] and good monitors of environmental change (Furness & Greenwood, 1996) [8]. Insectivorous birds act as natural agents of pest control and hence can be beneficial to farmers. Ruthless use of pesticides may lead to the depletion of insects thereby leading to the disappearance of insectivorous birds. Birds of prey are natural scavengers and their survival is of ecological importance in terms of disease control. The greatest threats to wildlife are posed by human activities, and birds, living close to humans are more vulnerable. During the past few decades the entire landscape has undergone marked changes owing to urbanisation, leading to habitat alteration. Therefore, proper monitoring of population dynamics of avifauna at a landscape level is necessary. Given the magnitude of arable land in India and the level of association of birds with agricultural landscapes, it is recommended that detailed studies be carried out on various aspects of agricultural ornithology. This calls for the need to conduct intensive studies in order to keep track of the population dynamics of birds in human-dominated, agricultural landscapes. Also the drivers of habitat alteration and climate change make it imperative to carry out monitoring of avifauna in human-dominated, particularly, agricultural landscapes. The present study is expected to form baseline information for further studies on various aspects of avian ecology in the region.

Table 2: Relative diversity (RDi) of families in the present study

	Family	No. of species	Rdi
1	Accipitridae	10	6.85
2	Muscicapidae	10	6.85
3	Cisticolidae	9	6.16

4	Ardeidae	7	4.79
5	Columbidae	7	4.79
6	Motacillidae	6	4.11
7	Scolopacidae	5	3.42
8	Sturnidae	5	3.42
9	Ciconiidae	4	2.74
10	Estrildidae	4	2.74
11	Falconidae	4	2.74
12	Hirundinidae	4	2.74
13	Leiotrichidae	4	2.74
14	Rallidae	4	2.74
15	Acrocephalidae	3	2.05
16	Alaudidae	3	2.05
17	Corvidae	3	2.05
18	Cuculidae	3	2.05
19	Dicruridae	3	2.05
20	Laniidae	3	2.05
21	Phalacrocoracidae	3	2.05
22	Phasianidae	3	2.05
23	Psittacidae	3	2.05
24	Sylviidae	3	2.05
25	Anatidae	2	1.37
26	Charadriidae	2	1.37
27	Jacaniidae	2	1.37
28	Megalaimidae	2	1.37
29	Phylloscopidae	2	1.37
30	Ploceidae	2	1.37
31	Strigidae	2	1.37
32	Threskiornithidae	2	1.37
33	Alcedinidae	1	0.68
34	Anhingidae	1	0.68
35	Bucerotidae	1	0.68
36	Coraciidae	1	0.68
37	Emberizidae	1	0.68
38	Gruidae	1	0.68
39	Locustellidae	1	0.68
40	Meropidae	1	0.68
41	Nectariniidae	1	0.68
42	Passeridae	1	0.68
43	Pellorneidae	1	0.68
44	Picidae	1	0.68
45	Pycnonotidae	1	0.68
46	Recurvirostridae	1	0.68
47	Turnicidae	1	0.68
48	Upupidae	1	0.68
49	Zosteropidae	1	0.68

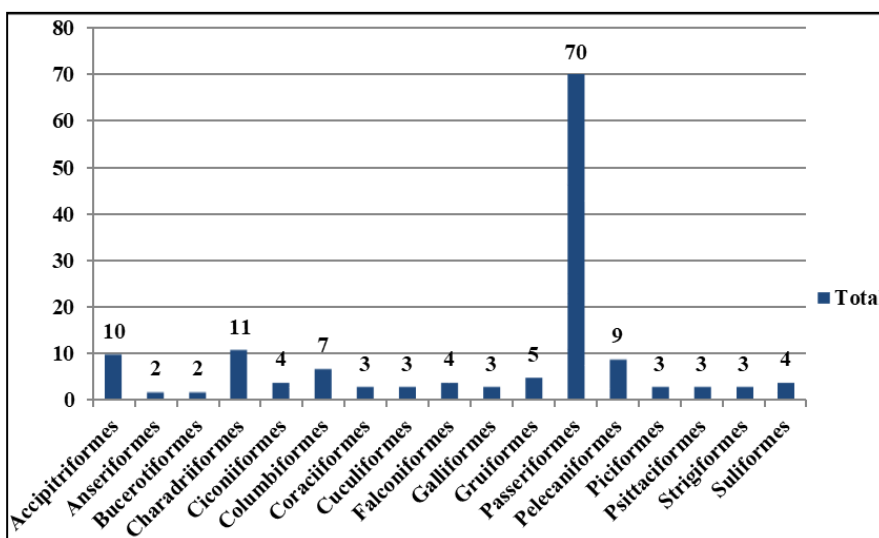


Fig 3: Total number of species belonging to different orders

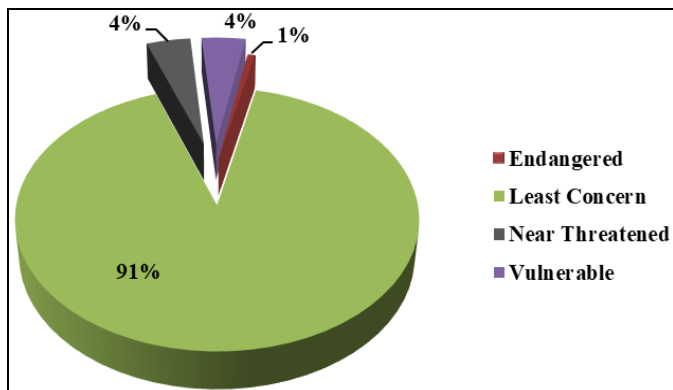


Fig 4: Proportion of species according to conservation status

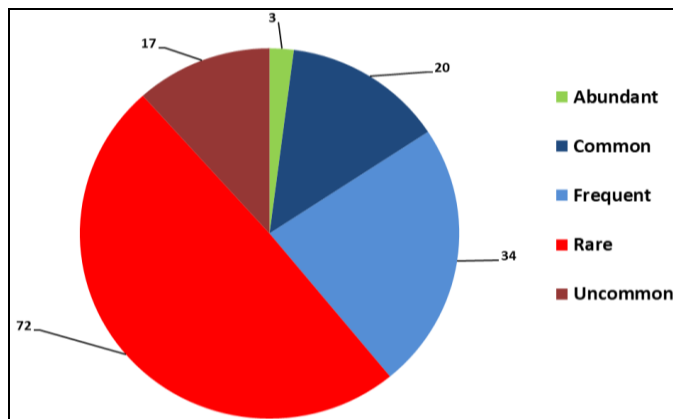


Fig 6: Number of species based on abundance scale

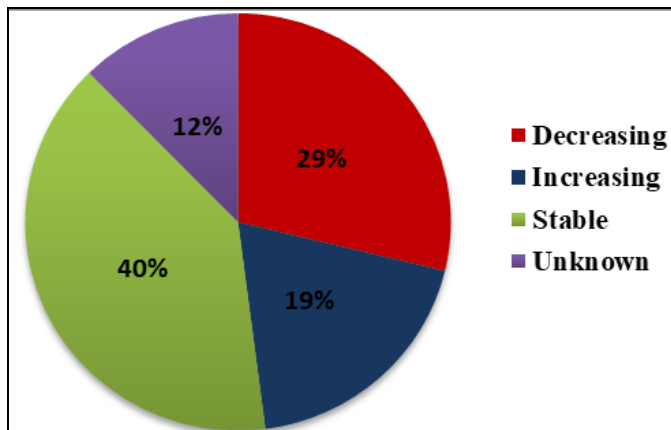


Fig 5: Proportion of species according to population trend

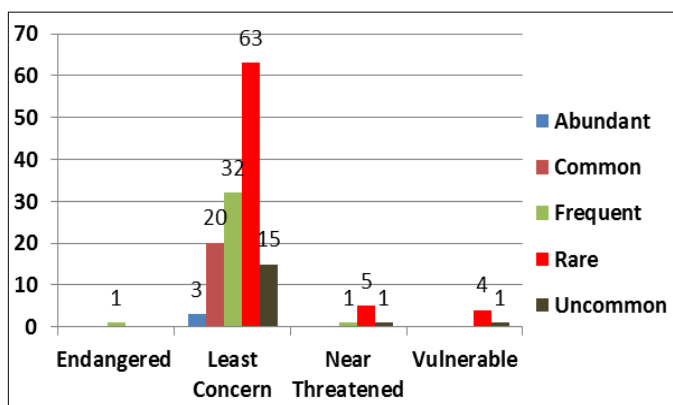


Fig 7: Encounter rate vs. IUCN Status

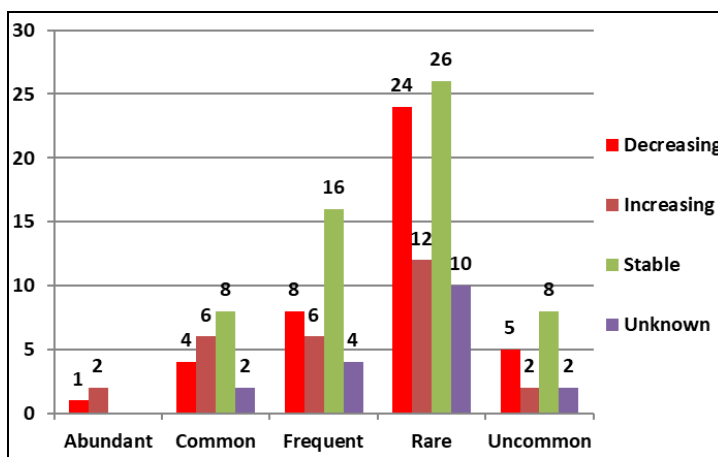


Fig 8: Encounter rate vs. Population trend

Table 3: Species recorded during the present study along with their respective population trend IUCN status, encounter rates per 10 hrs. and ranking in abundance scale.

	Common Name	Scientific Name	Order	Family	Trend	Status (IUCN)	Encounter rate per 10 Hrs	Scale
1.	Egyptian Vulture	<i>Neophron percnopterus</i>	Accipitriformes	Accipitridae	Decreasing	Endangered	3.80	Frequent
2.	Black-winged Kite	<i>Elanus caeruleus</i>	Accipitriformes	Accipitridae	Stable	Least Concern	1.71	Uncommon
3.	Besra	<i>Accipiter virgatus</i>	Accipitriformes	Accipitridae	Decreasing	Least Concern	0.06	Rare
4.	Bonelli's Eagle	<i>Aquila fasciata</i>	Accipitriformes	Accipitridae	Decreasing	Least Concern	0.11	Rare
5.	Brahminy Kite	<i>Haliastur indus</i>	Accipitriformes	Accipitridae	Decreasing	Least Concern	0.11	Rare
6.	Crested Serpent Eagle	<i>Spilornis cheela</i>	Accipitriformes	Accipitridae	Stable	Least Concern	0.22	Rare
7.	Eurasian Sparrowhawk	<i>Accipiter nisus</i>	Accipitriformes	Accipitridae	Stable	Least Concern	0.17	Rare
8.	Shikra	<i>Accipiter badius</i>	Accipitriformes	Accipitridae	Stable	Least Concern	0.72	Rare
9.	Black Kite	<i>Milvus migrans</i>	Accipitriformes	Accipitridae	Unknown	Least Concern	8.10	Frequent
10.	Indian Spotted Eagle	<i>Clanga hastata</i>	Accipitriformes	Accipitridae	Decreasing	Vulnerable	0.22	Rare
11.	Cotton Pygmy Goose	<i>Nettapus coromandelianus</i>	Anseriformes	Anatidae	Stable	Least Concern	0.39	Rare
12.	Common Pochard	<i>Aythya ferna</i>	Anseriformes	Anatidae	Decreasing	Vulnerable	0.28	Rare
13.	Indian Grey Hornbill	<i>Ocyrceros birostris</i>	Bucerotiformes	Bucerotidae	Stable	Least Concern	3.31	Frequent

14	Hoopoe	<i>Upupa epops</i>	Bucerotiformes	Upupidae	Decreasing	Least Concern	2.48	Frequent
15	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Charadriiformes	Charadriidae	Stable	Least Concern	0.11	Rare
16	Red-Wattled Lapwing	<i>Vanellus malabaricus</i>	Charadriiformes	Charadriidae	Unknown	Least Concern	34.27	Common
17	Bronze-winged Jacana	<i>Metopidius indicus</i>	Charadriiformes	Jacaniidae	Unknown	Least Concern	0.72	Rare
18	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Charadriiformes	Jacaniidae	Decreasing	Least Concern	0.06	Rare
19	Black-winged Stilt	<i>Himantopus himantopus</i>	Charadriiformes	Recurvirostridae	Increasing	Least Concern	5.34	Frequent
20	Little Stint	<i>Calidris minuta</i>	Charadriiformes	Scolopacidae	Increasing	Least Concern	1.71	Uncommon
21	Common Greenshank	<i>Tringa nebularia</i>	Charadriiformes	Scolopacidae	Stable	Least Concern	0.11	Rare
22	Common Sandpiper	<i>Actitis hypoleucos</i>	Charadriiformes	Scolopacidae	Decreasing	Least Concern	0.94	Rare
23	Green Sandpiper	<i>Tringa ochropus</i>	Charadriiformes	Scolopacidae	Increasing	Least Concern	0.11	Rare
24	Temminck's Stint	<i>Calidris temminckii</i>	Charadriiformes	Scolopacidae	Unknown	Least Concern	0.11	Rare
25	Barred Buttonquail	<i>Turnix suscitator</i>	Charadriiformes	Turnicidae	Increasing	Least Concern	0.17	Rare
26	Asian Openbill	<i>Anastomus oscitans</i>	Ciconiiformes	Ciconiidae	Unknown	Least Concern	0.17	Rare
27	Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	Ciconiiformes	Ciconiidae	Decreasing	Near Threatened	0.28	Rare
28	Painted Stork	<i>Mycteria leucocephala</i>	Ciconiiformes	Ciconiidae	Decreasing	Near Threatened	0.06	Rare
29	Wolly-necked Stork	<i>Ciconia episcopus</i>	Ciconiiformes	Ciconiidae	Decreasing	Vulnerable	0.17	Rare
30	Red Collared Dove	<i>Streptopelia tranquebarica</i>	Columbiformes	Columbidae	Decreasing	Least Concern	1.71	Uncommon
31	Oriental Turtle Dove	<i>Streptopelia orientalis</i>	Columbiformes	Columbidae	Stable	Least Concern	0.11	Rare
32	Yellow Footed Green Pigeon	<i>Treron phoenicopterus</i>	Columbiformes	Columbidae	Increasing	Least Concern	0.55	Rare
33	Laughing Dove	<i>Spilopelia senegalensis</i>	Columbiformes	Columbidae	Stable	Least Concern	9.31	Frequent
34	Spotted Dove	<i>Spilopelia chinensis</i>	Columbiformes	Columbidae	Increasing	Least Concern	2.20	Frequent
35	Collared Dove	<i>Streptopelia decaocto</i>	Columbiformes	Columbidae	Increasing	Least Concern	27.49	Common
36	Blue Rock Pigeon	<i>Columba livia</i>	Columbiformes	Columbidae	Decreasing	Least Concern	53.39	Abundant
37	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Coraciiformes	Alcedinidae	Increasing	Least Concern	9.31	Frequent
38	Indian Roller	<i>Coracias benghalensis</i>	Coraciiformes	Coraciidae	Increasing	Least Concern	0.99	Rare
39	Green Bee-Eater	<i>Merops orientalis</i>	Coraciiformes	Meropidae	Increasing	Least Concern	13.55	Common
40	Indian Cuckoo	<i>Cuculus micropterus</i>	Cuculiformes	Cuculidae	Decreasing	Least Concern	0.06	Rare
41	Asian Koel	<i>Eudynamis scolopacea</i>	Cuculiformes	Cuculidae	Stable	Least Concern	2.81	Frequent
42	Crow Pheasant	<i>Centropus sinensis</i>	Cuculiformes	Cuculidae	Stable	Least Concern	6.06	Frequent
43	Common Kestrel	<i>Falco tinnunculus</i>	Falconiformes	Falconidae	Decreasing	Least Concern	0.17	Rare
44	Peregrine Falcon	<i>Falco peregrinus</i>	Falconiformes	Falconidae	Stable	Least Concern	0.06	Rare
45	Laggar Falcon	<i>Falco jugger</i>	Falconiformes	Falconidae	Decreasing	Near Threatened	0.11	Rare
46	Red-headed Falcon	<i>Falco chicquera</i>	Falconiformes	Falconidae	Decreasing	Near Threatened	0.06	Rare
47	Black Francolin	<i>Francolinus francolinus</i>	Galliformes	Phasianidae	Stable	Least Concern	0.55	Rare
48	Indian Peafowl	<i>Pavo cristatus</i>	Galliformes	Phasianidae	Stable	Least Concern	7.99	Frequent
49	Grey Francolin	<i>Francolinus pondicerianus</i>	Galliformes	Phasianidae	Stable	Least Concern	12.73	Common
50	Sarus Crane	<i>Antigone antigone</i>	Gruiformes	Gruidae	Decreasing	Vulnerable	1.43	Uncommon
51	Eurasian Coot	<i>Fulica atra</i>	Gruiformes	Rallidae	Increasing	Least Concern	0.77	Rare
52	Common Moorhen	<i>Gallinula chloropus</i>	Gruiformes	Rallidae	Stable	Least Concern	2.48	Frequent
53	Purple Swampfen	<i>Porphyrio porphyrio</i>	Gruiformes	Rallidae	Unknown	Least Concern	2.64	Frequent
54	White-breasted Waterhen	<i>Amouromis phoenicurus</i>	Gruiformes	Rallidae	Unknown	Least Concern	6.61	Frequent
55	Booted Warbler	<i>Iduna caligata</i>	Passeriformes	Acrocephalidae	Increasing	Least Concern	0.06	Rare
56	Paddyfield Warbler	<i>Acrocephalus agricola</i>	Passeriformes	Acrocephalidae	Decreasing	Least Concern	0.06	Rare
57	Syke's Warbler	<i>Iduna rama</i>	Passeriformes	Acrocephalidae	Stable	Least Concern	0.11	Rare
58	Ashy-crowned Sparrow-lark	<i>Eremopterix griseus</i>	Passeriformes	Alaudidae	Stable	Least Concern	0.99	Rare
59	Crested Lark	<i>Galerida cristata</i>	Passeriformes	Alaudidae	Decreasing	Least Concern	0.66	Rare
60	Indian Bush Lark	<i>Mirafra erythroptera</i>	Passeriformes	Alaudidae	Stable	Least Concern	0.17	Rare
61	Grey-breasted Prinia	<i>Prinia hodgsonii</i>	Passeriformes	Cisticolidae	Stable	Least Concern	1.05	Uncommon
62	Bright-headed/Golden-headed Cisticola	<i>Cisticola exilis</i>	Passeriformes	Cisticolidae	Increasing	Least Concern	0.06	Rare
63	Common Tailorbird	<i>Orthotomus sutorius</i>	Passeriformes	Cisticolidae	Stable	Least Concern	0.94	Rare
64	Graceful Prinia	<i>Prinia gracilis</i>	Passeriformes	Cisticolidae	Stable	Least Concern	0.11	Rare
65	Jungle Prinia	<i>Prinia sylvatica</i>	Passeriformes	Cisticolidae	Decreasing	Least Concern	0.66	Rare
66	Zitting Cisticola	<i>Cisticola juncidis</i>	Passeriformes	Cisticolidae	Increasing	Least Concern	2.59	Frequent
67	Ashy Prinia	<i>Prinia socialis</i>	Passeriformes	Cisticolidae	Stable	Least Concern	12.95	Common
68	Plain Prinia	<i>Prinia inornata</i>	Passeriformes	Cisticolidae	Stable	Least Concern	17.02	Common
69	Yellow-bellied Prinia	<i>Prinia flaviventris</i>	Passeriformes	Cisticolidae	Decreasing	Least Concern	12.62	Common
70	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Passeriformes	Corvidae	Decreasing	Least Concern	5.40	Frequent
71	House Crow	<i>Corvus splendens</i>	Passeriformes	Corvidae	Stable	Least Concern	29.81	Common
72	Large-Billed Crow	<i>Corvus macrorhynchos</i>	Passeriformes	Corvidae	Stable	Least Concern	18.68	Common
73	White-Bellied Drongo	<i>Dicrurus caeruleus</i>	Passeriformes	Dicruridae	Unknown	Least Concern	1.21	Uncommon
74	Ashy Drong	<i>Dicrurus leucophaeus</i>	Passeriformes	Dicruridae	Unknown	Least Concern	0.33	Rare
75	Black Drongo	<i>Dicrurus macrocercus</i>	Passeriformes	Dicruridae	Unknown	Least Concern	15.26	Common
76	Crested Bunting	<i>Emberiza lathami</i>	Passeriformes	Emberizidae	Stable	Least Concern	0.06	Rare
77	Black-Headed Munia	<i>Lonchura malacca</i>	Passeriformes	Estrildidae	Stable	Least Concern	0.11	Rare
78	Red Avadavat	<i>Amandava amandava</i>	Passeriformes	Estrildidae	Stable	Least Concern	0.66	Rare
79	Scaly-Breasted Munia	<i>Lonchura punctulata</i>	Passeriformes	Estrildidae	Stable	Least Concern	0.22	Rare
80	Indian Silverbill	<i>Euodice malabarica</i>	Passeriformes	Estrildidae	Stable	Least Concern	4.74	Frequent
81	Asian Plain Martin	<i>Riparia chinensis</i>	Passeriformes	Hirundinidae	Decreasing	Least Concern	0.39	Rare
82	Streak-throated Swallow	<i>Petrochelidon fluvicola</i>	Passeriformes	Hirundinidae	Increasing	Least Concern	0.88	Rare
83	Wire-tailed Swallow	<i>Hirundo smithii</i>	Passeriformes	Hirundinidae	Increasing	Least Concern	0.66	Rare
84	Barn Swallow	<i>Hirundo rustica</i>	Passeriformes	Hirundinidae	Decreasing	Least Concern	4.79	Frequent
85	Bay-backed Shrike	<i>Lanius vittatus</i>	Passeriformes	Laniidae	Stable	Least Concern	1.54	Uncommon
86	Long-tailed Shrike	<i>Lanius schach</i>	Passeriformes	Laniidae	Unknown	Least Concern	0.11	Rare
87	Southern Grey Shrike	<i>Lanius meridionalis</i>	Passeriformes	Laniidae	Decreasing	Least Concern	0.06	Rare

88	Striated Babbler	<i>Argya earlei</i>	Passeriformes	Leiotrichidae	Decreasing	Least Concern	1.82	Uncommon
89	Common Babbler	<i>Argya caudata</i>	Passeriformes	Leiotrichidae	Stable	Least Concern	5.90	Frequent
90	Jungle Babbler	<i>Turdoides striata</i>	Passeriformes	Leiotrichidae	Stable	Least Concern	38.68	Common
91	Large Grey Babbler	<i>Argya malcolmi</i>	Passeriformes	Leiotrichidae	Stable	Least Concern	10.30	Common
92	Striated Grassbird	<i>Megalurus palustris</i>	Passeriformes	Locustellidae	Unknown	Least Concern	0.28	Rare
93	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Passeriformes	Motacillidae	Stable	Least Concern	1.98	Uncommon
94	Olive-backed Pipit	<i>Anthus hodgsoni</i>	Passeriformes	Motacillidae	Stable	Least Concern	0.55	Rare
95	Paddyfield Pipit	<i>Anthus rufulus</i>	Passeriformes	Motacillidae	Stable	Least Concern	8.32	Frequent
96	Tree Pipit	<i>Anthus trivialis</i>	Passeriformes	Motacillidae	Decreasing	Least Concern	9.15	Frequent
98	White Wagtail	<i>Motacilla alba</i>	Passeriformes	Motacillidae	Stable	Least Concern	5.29	Frequent
99	Western Yellow Wagtail	<i>Motacilla flava</i>	Passeriformes	Motacillidae	Decreasing	Least Concern	11.02	Common
100	Bluethroat	<i>Cyanecula svecica</i>	Passeriformes	Muscicapidae	Stable	Least Concern	1.54	Uncommon
101	Indian Robin	<i>Saxicoloides fulicatus</i>	Passeriformes	Muscicapidae	Stable	Least Concern	1.82	Uncommon
102	Oriental Magpie Robin	<i>Copsychus saularis</i>	Passeriformes	Muscicapidae	Stable	Least Concern	1.43	Uncommon
103	Grey Bushchat	<i>Saxicola ferreus</i>	Passeriformes	Muscicapidae	Stable	Least Concern	0.17	Rare
104	Isabelline Wheatear	<i>Oenanthe isabellina</i>	Passeriformes	Muscicapidae	Stable	Least Concern	0.06	Rare
105	Brown RockChat	<i>Oenanthe fusca</i>	Passeriformes	Muscicapidae	Stable	Least Concern	4.79	Frequent
106	Common Stonechat	<i>Saxicola torquatus</i>	Passeriformes	Muscicapidae	Stable	Least Concern	4.96	Frequent
107	Pied Bushchat	<i>Saxicola caprata</i>	Passeriformes	Muscicapidae	Stable	Least Concern	8.32	Frequent
108	White-tailed Stonechat	<i>Saxicola leucurus</i>	Passeriformes	Muscicapidae	Stable	Least Concern	2.26	Frequent
109	Hodgson's Bushchat	<i>Saxicola insignis</i>	Passeriformes	Muscicapidae	Decreasing	Vulnerable	0.33	Rare
110	Purple Sunbird	<i>Cinnyris asiaticus</i>	Passeriformes	Nectariniidae	Stable	Least Concern	2.04	Frequent
111	House Sparrow	<i>Passer domesticus</i>	Passeriformes	Passeridae	Decreasing	Least Concern	28.15	Common
112	Rufous-rumped Grassbird	<i>Graminicola bengalensis</i>	Passeriformes	Pellorneidae	Decreasing	Least Concern	0.06	Rare
113	Dusky Warbler	<i>Phylloscopus fuscatus</i>	Passeriformes	Phylloscopidae	Stable	Least Concern	0.33	Rare
114	Common Chiffchaff	<i>Phylloscopus collybita</i>	Passeriformes	Phylloscopidae	Increasing	Least Concern	2.20	Frequent
115	Baya Weaver	<i>Ploceus philippinus</i>	Passeriformes	Ploceidae	Stable	Least Concern	4.08	Frequent
116	Black-breasted Weaver	<i>Ploceus benghalensis</i>	Passeriformes	Ploceidae	Stable	Least Concern	19.01	Common
117	Brahminy Starling	<i>Sturnia pagodarum</i>	Passeriformes	Sturnidae	Unknown	Least Concern	1.87	Uncommon
118	Common Starling	<i>Sturnus vulgaris</i>	Passeriformes	Sturnidae	Decreasing	Least Concern	7.99	Frequent
119	Bank Myna	<i>Acridotheres ginginianus</i>	Passeriformes	Sturnidae	Increasing	Least Concern	28.98	Common
120	Common Myna	<i>Acridotheres tristis</i>	Passeriformes	Sturnidae	Increasing	Least Concern	58.62	Abundant
121	Pied Starling	<i>Gracupica contra</i>	Passeriformes	Sturnidae	Increasing	Least Concern	54.27	Abundant
122	Common Whitethroat	<i>Sylvia communis</i>	Passeriformes	Sylviidae	Increasing	Least Concern	0.11	Rare
123	Lesser Whitethroat	<i>Sylvia curruca</i>	Passeriformes	Sylviidae	Stable	Least Concern	0.72	Rare
124	Orphean Warbler	<i>Sylvia crossirostris</i>	Passeriformes	Sylviidae	Increasing	Least Concern	0.17	Rare
125	Oriental White-eye	<i>Zosterops palpebrosus</i>	Passeriformes	Zosteropidae	Decreasing	Least Concern	0.66	Rare
126	Great Egret	<i>Ardea alba</i>	Pelecaniformes	Ardeidae	Unknown	Least Concern	0.11	Rare
127	Grey Heron	<i>Ardea cinerea</i>	Pelecaniformes	Ardeidae	Unknown	Least Concern	0.06	Rare
128	Purple Heron	<i>Ardea purpurea</i>	Pelecaniformes	Ardeidae	Decreasing	Least Concern	0.33	Rare
129	Indian Pond Heron	<i>Ardeola grayii</i>	Pelecaniformes	Ardeidae	Unknown	Least Concern	2.15	Frequent
130	Little Egret	<i>Egretta garzetta</i>	Pelecaniformes	Ardeidae	Increasing	Least Concern	2.64	Frequent
131	Cattle Egret	<i>Bubulcus ibis</i>	Pelecaniformes	Ardeidae	Increasing	Least Concern	29.86	Common
132	Intermediate Egret	<i>Ardea intermedia</i>	Pelecaniformes	Ardeidae	Decreasing	Least Concern	20.55	Common
133	Black Ibis	<i>Pseudibis papillosa</i>	Pelecaniformes	Threskiornithidae	Decreasing	Least Concern	4.41	Frequent
134	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Pelecaniformes	Threskiornithidae	Decreasing	Near Threatened	1.10	Uncommon
135	Brown-headed Barbet	<i>Psilopogon zeylanicus</i>	Piciformes	Megalaimidae	Stable	Least Concern	1.98	Uncommon
136	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Piciformes	Megalaimidae	Increasing	Least Concern	1.27	Uncommon
137	White-naped Woodpecker	<i>Chrysocolaptes festivus</i>	Piciformes	Picidae	Stable	Least Concern	0.06	Rare
138	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	Psittaciformes	Psittacidae	Decreasing	Least Concern	1.38	Uncommon
139	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Psittaciformes	Psittacidae	Increasing	Least Concern	20.61	Common
140	Alexandrine Parakeet	<i>Psittacula eupatria</i>	Psittaciformes	Psittacidae	Decreasing	Near Threatened	3.42	Frequent
141	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Strigiformes	Pycnonotidae	Increasing	Least Concern	21.27	Common
142	Jungle Owlet	<i>Glaucidium radiatum</i>	Strigiformes	Strigidae	Stable	Least Concern	0.06	Rare
143	Spotted Owlet	<i>Athene brama</i>	Strigiformes	Strigidae	Stable	Least Concern	0.88	Rare
144	Oriental Darter	<i>Anhinga melanogaster</i>	Suliformes	Anhingidae	Decreasing	Near Threatened	0.06	Rare
145	Great Cormorant	<i>Phalacrocorax carbo</i>	Suliformes	Phalacrocoracidae	Increasing	Least Concern	0.06	Rare
146	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Suliformes	Phalacrocoracidae	Unknown	Least Concern	0.06	Rare
147	Little Cormorant	<i>Microcarbo niger</i>	Suliformes	Phalacrocoracidae	Unknown	Least Concern	0.22	Rare

5. Acknowledgements

The authors express their gratitude to DST PURSE II for the financial assistance received for field work.

6. References

- Balasubramanian A. Agro-Ecological Zones of India, 2013. <https://doi.org/10.13140/RG.2.2.30133.58085>
- Bhattacharya R, Roy R. Impacts of Communication Towers on Avians : A Review. 2013; 7109:137-139.
- Bibby C, Jones M, Marsden S. Expedition Field Techniques: Bird Surveys: Expedition Advisory Centre. In Royal Geographical Society with the Institute of British Geographers, London, 1998, 44.
- Chhangani AK. Avifauna in and around Jodhpur city, Rajasthan, India. 2002a; 42(2).
- Chhangani AK. Avifauna of Kumbhalgarh Wildlife Sanctuary in the Aravalli Hills of Rajasthan, India. Zoos' Print Journal. 2002b; 17(4):764-768. <https://doi.org/10.11609/jott.zpj.17.4.764-8>
- Dhindsa MS, Saini HK. Agricultural ornithology: an Indian perspective. Journal of Biosciences. 1994; 19(4):391-402. <https://doi.org/10.1007/BF02703176>
- FAO. FAO in India: Food Grain Production - Food and Agriculture Organization of the United Nations. Retrieved 6 October 2019, 2016, from FAO website website: <http://www.fao.org/india/fao-in-india/en/>
- Furness RW, Greenwood JJD. Birds as Monitors of Environmental Change. In Colonial Waterbirds, 1996, 19.

<https://doi.org/10.2307/1521825>

9. Gill F, Donsker D (Eds). IOC World Bird List (v8.2) 2018. doi: 10.14344/IOC.ML.8.2.
10. Gopi Sundar KS, Subramanya S. Bird use of Rice Fields in the Indian Subcontinent. *Water birds*. 2010; 33(sp1):44. <https://doi.org/10.1675/063.033.s104>
11. Grimmett R, Inskipp C, Inskipp T. *Birds of the Indian Subcontinent.pdf* (Jim Martin, Ed.). Bloomsbuty India, 2016.
12. Hadinoto H, Suhesti E. Species Diversity and Bird Feed in Residential Complex. *IOP Conference Series: Earth and Environmental Science*. 2017; 97(1). <https://doi.org/10.1088/1755-1315/97/1/012001>
13. Hiragond NC, Lokhande AS. Avifauna checklist of Tillari. Chandgad Taluk, Kolhapur, Southern Maharashtra. 2016; 4(1):57-65.
14. Hossain A, Aditya G. Avian Diversity in Agricultural Landscape: Records from Burdwan, West Bengal, India. *Proceedings of the Zoological Society*. 2016; 69(1):38-51. <https://doi.org/10.1007/s12595-014-0118-3>
15. Hutto RL, Pletschet SM, Hendricks P. And Season Use factory for answering the majority of research questions involving bird counts (Verner 1985), the use of counting methods that result in an estimate of bird density (an absolute measure of number per unit area) has become en- trenched, 1986, 593-602.
16. Kasambe R, Dudhe N, Wagh G, Kale M, More K. Bird biodiversity in agricultural landscape in Vidarbha, Maharashtra. *Bird biodiversity in agricultural landscape in Vidarbha, Maharashtra*. 2015.
17. La Torre-Cuadros MDLÁ, Herrando-Pérez S, Young KR. Diversity and structural patterns for tropical montane and premontane forests of central Peru, with an assessment of the use of higher-taxon surrogacy. *Biodiversity and Conservation*, 2007; 16(10):2965-2988. <https://doi.org/10.1007/s10531-007-9155-9>
18. Mukhopadhyay S, Mazumdar S. Composition, diversity and foraging guilds of avifauna in a suburban area of southern West Bengal, India. *The Ring*, 2018; 39(1):103-120. <https://doi.org/10.1515/ring-2017-0004>
19. Praveen J, Jayapal R, Pittie A. A Checklist of the Birds of India. *Indian Birds*. 2016; 11(5-6):113-172.
20. Praveen J, Jayapal R, Pittie A. Taxonomic updates to the checklist of birds of India and the South Asian region. 2018, 37-42.
21. Protected Areas of India. (n.d.). Retrieved 6 October 2019, from 2019-09-14 website: http://www.wiienviis.nic.in/Database/Protected_Area_854.aspx
22. Ramesh T, Chakravarthi JPP, Balachandran S, Kalle R. Birds of lower Palni Hills, Western Ghats, Tamil Nadu. *Journal of Threatened Taxa*. 2012; 04(14):3269-3283. <https://doi.org/10.11609/jott.o3051.3269-83>
23. Samson A, Ramakrishnan B, Karthick S, Santhosh Kumar P, Ilakkia M, Chitheena A *et al*. Bird-o-soar Diversity and status of avifauna in Doddabetta hills and surrounding areas of Udthagamandalam. *Zoo's Print*. 2018; 33(3):23-36.
24. Sankar K, Mohan D, Pandey S. Birds of Sariska Tiger Reserve, Rajasthan, India. *Forktail*. 2006; 8:133-141.
25. Stanton RL, Morrissey CA, Clark RG. Analysis of trends and agricultural drivers of farmland bird declines in North America: A review. *Agriculture, Ecosystems and Environment*. 2018; 254(2017):244-254. <https://doi.org/10.1016/j.agee.2017.11.028>
26. Sutherland WJ. *Ecological Census Techniques: A Handbook*. In Cambridge University Press, 2006. <https://doi.org/10.2307/2960638>
27. World Bank. (n.d.). Agricultural land (% of land area) | Data. Retrieved 6 October 2018, from <https://data.worldbank.org/indicator/AG.LND.AGRI.ZS>
28. Yaseen, Saxena MR, Koli VK. Avian diversity of Sitamata Wildlife Sanctuary, Rajasthan, India. *Geobios*. 2011; 38:257-264.