

Research Article

Bird habitats in Gosekhurd region of Godavari basin, across Wainganga river IndiaPatil Kishor G.¹ Shende Virendra A.^{2*} and Uke S. B.³¹Department of Zoology, Government Vidarbha Institute of Science and Humanities, Amravati, India.²Department of Forensic Biology, Government Institute of Forensic Science, Nagpur (M.S.) India.³Office of Superintendent of Police, Railways, Nagpur (M.S.) India.* Corresponding author: E. Mail- virushende@gmail.com

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Abstract

Wainganga River valley of Eastern Vidarbha hosts major part of lush green landscape. Gosekhurd Dam (Indira Sagar) is one of the largest irrigation project of central India (JI00481) located 20.8738154°N 79.6081781°E near Pauni of Bhandara district, Maharashtra on Wainganga river. It is a good habitat for birds and herpetofauna biodiversity. Bird watching and recording were done from January 2014 to December 2017. 241 species belonging to 152 genera, 46 families and 17 orders (Podicipediformes, Pelecaniformes, Ciconiiformes, Anseriformes, Falconiformes, Galliformes, Gruiformes, Charadriiformes, Columbiformes, Psittaciformes, Cuculiformes, Strigiformes, Caprimulgiformes, Apodiformes, Coraciiformes, Piciformes and Passeriformes) were recorded. The order Passeriformes is the largest order belonging to 16 families and 90 bird species. Out of total bird species, 109 (45.23%) are resident, 95 (39.42%) are resident migrant and 37 (15.35%) are migratory species. Wainganga Valley is of critical importance for Maharashtra to preserve its forests, wildlife, and tribal population dependent on it. Present investigation carried out to prepare an inclusive checklist of bird species and their ecological status in the study area.

Keywords: Avifauna, Birds, Gosekhurd Dam, Wainganga River, Godavari basin.

Introduction

The Indian subcontinent is very rich in biodiversity; contains about 1,300 species or over 13% of the world's birds (Grimmett *et al.*, 1998). Biodiversity is the varieties of life present on earth. Birds fulfill many ecological functions in their habitats. For instance, they are bioindicators of healthy ecosystems (Mistry *et al.*, 2008). Biodiversity is affected by climate change but it also makes an important contribution in migration and adaptation of birds. Birds are markers of environmental quality (Chavan *et al.*, 2015). Out of the more than 9,000 birds of the world, the Indian subcontinent contains about 1,300 species, or over 13% of the world's birds (Grimmett *et al.*, 1998). The recent studies of freshwater biodiversity and wetlands are found to be the richest biodiversity sites by holding major share of the existing avifauna. Freshwater wetland support

20% of the known range of biodiversity in India. Avifauna is an important for the ecosystem as they play various roles as scavenger, pollinators and predators of insect pest (Padmavati *et al.*, 2010). The changes in environment like urbanization and industrialization disturbs the avian habitats (Sanjay, 1993).

Gosekhurd Reservoir (Indira Sagar) is one of the largest irrigation project of central India (JI00481) located 20.8738154°N 79.6081781°E near Pauni of Bhandara district, Maharashtra on Wainganga river. This reservoir regulates irrigation water throughout the year to some parts of Chandrapur, Bhandara and Nagpur districts of Eastern Maharashtra; the reservoir occupies the total surface area of 222 km² (86 sq. mi.) and the catchment area of 34,862 km² (13,460 sq. mi.). The Gosekhurd reservoir region of Wainganga basins consists of rich and diverse floral ecosystems viz., aquatic submerged and floating vegetation; grasslands; Herbs and bush lands; trees and forests and agroecosystems of mainly paddy fields etc. This provides good environment, shelter, feeding and nesting grounds for a broad range of faunal species. The area includes very rich diversity of aquatic and terrestrial Arthropods; Molluscs; Pisces; Amphibians; Reptiles: Aves and Mammalian Wildlife.

Wainganga Valley is of critical importance for Maharashtra to preserve its forests, wildlife, and tribal population dependent on it. It is the good habitat for diverse range of fauna species. Therefore, the present investigation carried out to prepare an inclusive checklist and ecological status of bird species of this region.

Material and Methods

The investigations have been carried out for a period of four year from January 2014 to December 2017. The observations were made with the aid of binocular, digital cameras and handycam. Bird watching and recording were done biweekly in such a way that there should be least one visit in the study area during a month. The observations were made with the aid of a digital cameras and binoculars. The Line Transects Method (Gregory *et al.*, 2004) was adopted to study the bird population. The area of Gosekhurd region is covered by Line Transects of 6 points (Fig.1). The distance of each line is of approximately 2 km. The sites were visited in morning and evening hours to note maximum possible species of birds and to record its activities. Sometimes afternoon visits were made to observe the bird activities; particularly in winter season when the migratory species reported in the study area. The recorded species are identified with the help of photographs and by using standard books such as Ali (2001), Animal Life Encyclopedia and various publications etc. The checklist and catalogs of the avian species are prepared.

Results

The present study recorded 241 species of birds belonging to 152 genera, 46 families and 17 orders. The order Podicipediformes, Pelecaniformes, Ciconiiformes, Anseriformes, Falconiformes, Galliformes, Gruiformes, Charadriiformes, Columbiformes, Psittaciformes,

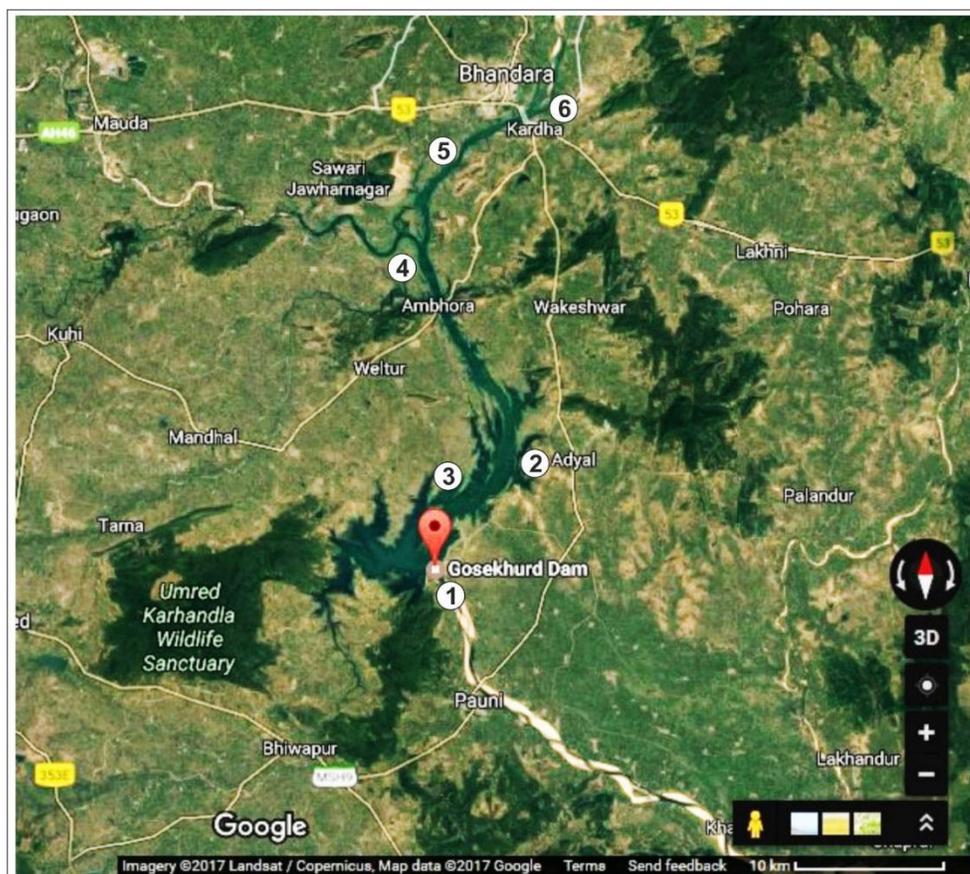


Figure 1. Map showing study area of Gosekhurd region of Wainganga basin, India. (P.C. Google map).

Cuculiformes, Strigiformes, Caprimulgiformes, Apodiformes, Coraciiformes, Piciformes and Passeriformes were consisted of 01 family, 02 genera and 02 species; 01 family, 02 genera and 04 species; 03 families, 17 genera and 24 species; 01 family, 07 genera and 17 species; 02 family, 14 genera and 21 species; 01 family, 06 genera and 09 species; 02 family, 05 genera and 06 species; 06 families, 16 genera and 26 species; 01 family, 03 genera and 07 species; 01 family, 01 genus and 03 species; 01 family, 07 genera and 09 species; 01 families, 05 genera and 05 species; 01 family, 01 genus and 02 species; 01 families, 03 genera and 03 species; 05 family, 07 genera and 08 species; 02 family, 05 genera and 05 species and 16 families, 51 genera and 90 species respectively (Table. 1 and Table. 3).

The maximum bird species were belonging to the order Passeriformes (37.34%) followed by Charadriiformes (10.79%); and Ciconiiformes (9.96%); Falconiformes (8.71%); Anseriformes (7.05%); Cuculiformes and Galliformes (3.73%); Coraciiformes (3.32%); Columbiformes (2.90%); Gruiformes (2.49%); Strigiformes and Piciformes (2.07%); Pelecaniformes (1.66%); Psittaciformes and Apodiformes (1.24%) and minimum species (0.83%) reported in order Caprimulgiformes and Podicipediformes (Fig. 2 and Fig.3).

These 17 orders were divided in 46 families. The largest number of families were reported in order Passeriformes (16) followed by Charadriiformes (06); Coraciiformes (05); Ciconiiformes (03); Falconiformes, Gruiformes, and Piciformes (02) and only single family reported in order Podicipediformes, Pelecaniformes, Anseriformes, Galliformes, Columbiformes, Psittaciformes, Cuculiformes Strigiformes, Caprimulgiformes and Apodiformes (Fig. 4, Table. 3).

In the present study out of total 241 bird species, 109 (45.23%) were resident, 95 (39.42%) were resident migrant and 37 (15.35%) were migratory species (Table. 2).

Table 1. Checklist of Avifauna of Gosekhurd region of Vainganga basin.

S. N.	Order	Family	Scientific Name	Common Name	Status
1.	Podicipediformes (1 Family)	Podicipedidae (2 Genera)2 Grebes	<i>Podiceps cristatus</i>	Great Crested Grebe	M
			<i>Tachybaptus ruficollis</i>	Little Grebe	R
2.	Pelecaniformes (1 Family)	Phalacrocoracidae (2 Genera) 4 Cormorants, Darters	<i>Anhinga melanogaster</i>	Darter	RM
			<i>Phalacrocorax carbo</i>	Great Cormorant	RM
			<i>Phalacrocorax fuscicollis</i>	Indian Cormorant	R
			<i>Phalacrocorax niger</i>	Little Cormorant	RM
3.	Ciconiiformes (3 Families)	Ardeidae (10 Genera)15 Hérons, Egrets and Bitterns	<i>Ardea cinerea</i>	Grey Heron	RM
			<i>Ardea insignis</i>	White billed Heron	R
			<i>Ardea purpurea</i>	Purple Heron	RM
			<i>Ardeola grayii</i>	Indian Pond Heron	R
			<i>Bubulcus ibis</i>	Cattle Egret	R
			<i>Butorides striata</i>	Little Heron	R
			<i>Casmerodius albus</i>	Large Egret	R
			<i>Dupetor flavicollis</i>	Black Bittern	RM
			<i>Egretta garzetta</i>	Little Egret	R
			<i>Egretta intermedia</i>	Smaller Egret	R
			<i>Ixobrychus cinnamomeus</i>	Chesnut Bittern	RM
			<i>Ixobrychus minus</i>	Little Bittern	M
			<i>Ixobrychus sinensis</i>	Yellow Bittern	RM
			<i>Mesophoyx intermedia</i>	Median Egret	R
		<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	RM	
		Ciconiidae (3 Genera)5 Storks	<i>Anastomus oscitans</i>	Asian Open bill	RM
			<i>Ciconia ciconia</i>	White Stork	M
			<i>Ciconia episcopus</i>	Woolly-necked Stork	RM
			<i>Ciconia nigra</i>	Black Stork	M
			<i>Mycteria leucocephala</i>	Painted Stork	RM
Threskiornithidae (4 Genera)4 Ibises and Spoon bills	<i>Platalea leucorodia</i>	Eurasian Spoonbill	M		
	<i>Plegadis falcinellus</i>	Glossy Ibis	RM		
	<i>Pseudibis papillosa</i>	Black Ibis	RM		
	<i>Threskiornis melanocephalus</i>	Oriental white Ibis	RM		
4.	Anseriformes (1 Family)	Anatidae (7 Genera)17 Ducks and Geese	<i>Anas acuta</i>	Northern Pintail	M
			<i>Anas clypeata</i>	Northern Shoveler	M
			<i>Anas crecca</i>	Common Teal	M
			<i>Anas falcata</i>	Falcated Duck	M
			<i>Anas penelope</i>	Eurasian Wigeon	M
			<i>Anas platyrhynchos</i>	Mallard	M
			<i>Anas poecilorhyncha</i>	Spot-billed Duck	M

			<i>Anas querquedula</i>	Garganey	M
			<i>Anas strepera</i>	Gadwall	M
			<i>Aythya ferina</i>	Common Pochard	M
			<i>Aythya fuligula</i>	Tufted Duck	M
			<i>Aythya nyrocha</i>	Ferruginous Pochard	M
			<i>Dendrocygna javanica</i>	Lesser Whistling-duck	RM
			<i>Nettapus coromandelianus</i>	Cotton Teal	R
			<i>Rhodonessa rufina</i>	Red-crested Pochard	M
			<i>Sarkidiornis melanotos</i>	Comb Duck	M
			<i>Tadorna ferruginea</i>	Ruddy Shelduck	M
5.	Falconiformes (1 Family)	Accipitridae (13 Genera)19 Hawks, Kites and Eagles	<i>Accipiter badius</i>	Shikra	RM
			<i>Accipiter nisus</i>	Eurasian Sparrowhawk	RM
			<i>Accipiter trivirgatus</i>	Crested Goshawk	M
			<i>Accipiter virgatus</i>	Besra	M
			<i>Aquila hastata</i>	Indian Spotted Eagle	RM
			<i>Aquila rapax</i>	Tawny Eagle	RM
			<i>Butastus teesa</i>	White-eyed Buzzard	RM
			<i>Buteo buteo</i>	Common Buzzard	RM
			<i>Circus aeruginosus</i>	Western Marsh Harrier	RM
			<i>Circus macrorous</i>	Pallid Harrier	RM
			<i>Circus pygargus</i>	Montagu's Harrier	M
			<i>Elanus caeruleus</i>	Black-shouldered Kite	RM
			<i>Haliastur indus</i>	Brahminy Kite	M
			<i>Hieraaetus fasciatus</i>	Bonelli's Eagle	M
			<i>Ictinaetus malayensis</i>	Black Eagle	M
			<i>Milvus migrans</i>	Black kite	RM
			<i>Pernis ptilorhyncus</i>	Oriental Honey-buzzard	RM
			<i>Spilornis cheela</i>	Crested Serpent Eagle	RM
			<i>Spizaetus cirrhatus</i>	Changeable Hawk Eagle	R
		Falconidae (1 Genus)2 Falcons	<i>Falco amurensis</i>	Apamur Falcon	M
			<i>Falco tinnunculus</i>	Common Kestrel	RM
6.	Galliformes (1 Family)	Phasianidae (6 Genera)9 Pheasants, Jungle Fowl, Partridges and Quails	<i>Coturnix coromandelica</i>	Rain Quail	R
			<i>Coturnix coturnix</i>	Common Quail	R
			<i>Francolinus pictus</i>	Painted Francolin	RM
			<i>Francolinus pondicerianus</i>	Grey Francolin	RM
			<i>Gallus gallus</i>	Red Junglefowl	R
			<i>Gallus sonneratii</i>	Grey Junglefowl	R
			<i>Pavo cristatus</i>	Indian Peafowl	RM
			<i>Perdicula asiatica</i>	Jungle Bush Quail	RM
			<i>Turnix suscitator</i>	Barred Buttonquail	R
7.	Gruiformes (2 Family)	Gruidae (1 Genus)1 Cranes	<i>Grus virgo</i>	Demoiselle Crane	M
		Rallidae (4 Genera)5 Rails and Coots	<i>Amaurornis akool</i>	Brown Crake	R
			<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	R
			<i>Fulica atra</i>	Common Coot	R
			<i>Gallinula chloropus</i>	Common Moorhen	R
			<i>Porphyrio porphyrio</i>	Purple Moorhen	RM
8.	Charadriiformes (6 Families)	Jacaniidae (2 Genera)2 Jacanas	<i>Hydrophasianus chirurgus</i>	Pheasant tailed Jacana	R
			<i>Metopidius indicus</i>	Bronze winged Jacana	R
		Charadriidae (9 Genera)17 Plowers, Curlews,	<i>Actitis hypoleucos</i>	Common Sandpiper	M
			<i>Calidris minuta</i>	Little Stint	R
			<i>Calidris temminckii</i>	Temminck's Stint	R

	Whimbrells, Godwits and Sandpipers		<i>Charadrius alexandrinus</i>	Kentish Plover	M			
			<i>Charadrius dubius</i>	Little Ringed Plover	RM			
			<i>Charadrius mongolus</i>	Lesser Sand Plover	M			
			<i>Esacus recurvirostris</i>	Great stone plover	RM			
			<i>Glareola maldivarum</i>	Oriental Pratincole	RM			
			<i>Limosa limosa</i>	Black-tailed Godwit	RM			
			<i>Philomachus pugnax</i>	Ruff	RM			
			<i>Tringa erythropus</i>	Spotted Redshank	M			
			<i>Tringa glareola</i>	Wood Sandpiper	RM			
			<i>Tringa nebularia</i>	Common Greenshank	M			
			<i>Tringa oerophus</i>	Green Sandpiper	R			
			<i>Tringa totanus</i>	Common Redshank	M			
			<i>Vanellus indicus</i>	Red-wattled Lapwing	R			
			<i>Vanellus malarbaricus</i>	Yellow-wattled Lapwing	RM			
			Rostratulidae (1 Genus)2	Painted snipe		<i>Gallinago gallinago</i>	Common Snipe	M
						<i>Gallinago stenura</i>	Pintail Snipe	RM
Recurvirostridae (1 Genus) 1	Stilts and Avocets		<i>Himantopus himantopus</i>	Black-winged Stilt	RM			
Glareolidae (1 Genus)1	Courasers		<i>Glareola lactea</i>	Small Pratincole	RM			
Laridae (2 Genera)3	Gulls and Terns		<i>Chlidonias hybrida</i>	Whiskered Tern	RM			
			<i>Sterna acuticauda</i>	Black-bellied Tern	RM			
			<i>Sterna aurantia</i>	River Tern	R			
9. Columbiformes (1 Family)	Columbidae (3 Genera)7	Pigeons and Doves	<i>Columba livia</i>	Blue rock Pigeon	R			
			<i>Streptopelia chinensis</i>	Spotted Dove	R			
			<i>Streptopelia decaocto</i>	Eurasian Collared Dove	R			
			<i>Streptopelia orientalis</i>	Oriental Turtle Dove	RM			
			<i>Streptopelia senegalensis</i>	Little Brown Dove	R			
			<i>Streptopelia tranquebarica</i>	Red Collared Dove	RM			
			<i>Treron phoenicoptera</i>	Yellow-footed Green Pigeon	RM			
10. Psittaciformes (1 Family)	Psittacidae (1 Genus)3	Parrots	<i>Psittacula cyanocephala</i>	Plum-headed Parakeet	RM			
			<i>Psittacula eupatria</i>	Alexandrine Parakeet	RM			
			<i>Psittacula krameri</i>	Rose ringed Parakeet	RM			
11. Cuculiformes (1 Family)	Cuculidae (7 Genera)9	Cucooks	<i>Cacomantis passerinus</i>	Indian palaintive Cuckoo	RM			
			<i>Centropus sinensis</i>	Greater Coucal	R			
			<i>Clamator jacobinus</i>	Pied Crested Cuckoo	RM			
			<i>Cuculus canorus</i>	Common Cuckoo	R			
			<i>Cuculus micropterus</i>	Indian Cuckoo	RM			
			<i>Cuculus varius</i>	Common Hawk Cuckoo	RM			
			<i>Eudynamis scolopacea</i>	Asian Koel	RM			
			<i>Phaenicophaeus leschenaultii</i>	Sirkeer Malkoha	RM			
12. Strigiformes (1 Families)	Strigidae (5 Genera)5	Owls	<i>Athene brama</i>	Spotted Owlet	R			
			<i>Glaucidium radiatum</i>	Jungle Owlet	R			
			<i>Ninox scutulata</i>	Brown Hawk Owl	R			
			<i>Otus bakkamoena</i>	Collared Scops Owl	R			
			<i>Tyto alba</i>	Barn Owl	R			
13. Caprimulgiformes (1 Family)	Caprimulgidae (1 Genus)2	Nightjars	<i>Caprimulgus asiaticus</i>	Common Indian Nightjar	R			
			<i>Caprimulgus indicus</i>	Indian Jungle Nightjar	R			
14. Apodiformes	Apodidae		<i>Apus affinis</i>	House Swift	R			

	(1 Families)	(3 Genera)3 Swifts	<i>Cypsiurus balasiensis</i>	Asian Palm Swift	R
			<i>Hemiprocne coronata</i>	Crested Treeswift	R
15.	Coraciiformes (5 Families)	Alcedinidae (3 Genera)3 Kingfishers	<i>Alcedo atthis</i>	Small Blue Kingfisher	R
			<i>Ceryle rudis</i>	Pied Kingfisher	R
		Meropidae (1 Genus)2 Bee-eaters	<i>Halcyon smyrnensis</i>	White-breasted Kingfisher	R
			<i>Merops orientalis</i>	Small Bee-eater	R
		Coraciidae (1 Genus)1 Rollers	<i>Merops philippinus</i>	Blue-tailed Bee-eater	R
			<i>Coracias benghalensis</i>	Indian Roller	R
		Upupidae (1 Genus)1 Hoopoes	<i>Upupa epops</i>	Common Hoopoe	R
Bucerotidae (1 Genus)1 Hornbills	<i>Ocyrceros birostris</i>	Grey Hornbill	R		
16.	Piciformes (2 Families)	Capitonidae (1 Genus)1 Barbets	<i>Megalaima haemacephala</i>	Crimson-breasted Barbet	R
			Picidae (4 Genera)4 Woodpeckers	<i>Chrysocolaptes festivus</i>	White-naped Woodpecker
		<i>Dendrocopos mahrattensis</i>		Yellow-crowned Woodpecker	R
		<i>Dinopium benghalense</i>		Black-rumped Flameback Woodpecker	R
		<i>Jynx torquilla</i>	Eurasian Wryneck	M	
17.	Passeriformes (16 Families)	Alaudidae (6 Genera)8 Larks	<i>Alauda gulgula</i>	Oriental Skylark	RM
			<i>Ammomanes phoenicura</i>	Rufous-tailed Finch Lark	R
			<i>Calandrella brachydactyla</i>	Greater Short-toed Lark	RM
			<i>Eremopterix griseus</i>	Ashy-crowned Sparrow Lark	R
			<i>Galerida deva</i>	Syke's Crested Lark	R
			<i>Mirafra assamica</i>	Bengal Bushlark	R
			<i>Mirafra cantillans</i>	Singing Bushlark	R
			<i>Mirafra erythroptera</i>	Red-winged Bushlark	R
		Hirundinidae (2 Genera)6 Swallows	<i>Hirundo concolor</i>	Dusky Crag Martin	R
			<i>Hirundo daurica</i>	Red-rumped Swallow	RM
			<i>Hirundo fluvicola</i>	Streak-throated Swallow	R
			<i>Hirundo rustica</i>	Common Swallow	RM
			<i>Hirundo smithii</i>	Wire-tailed Swallow	R
			<i>Riparia paludicola</i>	Plain Sand Martin	RM
		Daniidae (1 Genus)3 Shrikes	<i>Lanius cristatus</i>	Brown Shrike	RM
			<i>Lanius schach</i>	Rufous Backed Shrike	R
			<i>Lanius vittatus</i>	Bay-backed Shrike	RM
		Oriolidae (1 Genus)2 Orioles	<i>Oriolus oriolus</i>	Eurasian Golden Oriole	R
			<i>Oriolus xanthornus</i>	Black-headed Oriole	R
		Dicruridae (1 Genus)3 Drongos	<i>Dicrurus caerulescens</i>	White-bellied Drongo	RM
			<i>Dicrurus leucophaeus</i>	Ashy Drongo	RM
			<i>Dicrurus macrocercus</i>	Black Drongo	R
		Sturnidae (2 Genera)5 Mynas	<i>Acridotheres ginginianus</i>	Bank Myna	RM
<i>Acridotheres tristis</i>	Common Myna		R		
<i>Sturnus contra</i>	Asian Pied Starling		R		
<i>Sturnus pagodarum</i>	Brahminy Starling		R		
<i>Sturnus roseus</i>	Rosy Starling		RM		
Corvidae	<i>Corvus macrorhynchos</i>	Jungle Crow	R		

(2 Genera)3 Crows and Treepie	<i>Corvus splendens</i>	House Crow	R	
	<i>Dendrocitta vagabunda</i>	Rufous Treepie	R	
	Campephagidae			
	(3 Genera)6 Cuckooshriks and Minivets	<i>Coracina macei</i>	Large Cuckooshrike	R
		<i>Coracina melanoptera</i>	Black-headed Cuckooshrik	R
		<i>Pericrocotus cinnamomeus</i>	Small Minivet	R
		<i>Pericrocotus flammeus</i>	Scarlet Minivet	RM
		<i>Pericrocotus roseus</i>	Rosy Minivet	M
		<i>Tephrodornis pondicerianus</i>	Common Woodshrike	R
	Irenidae (1 Genera)1 Ioras	<i>Aegithina tiphia</i>	Common Iora	R
	Pycnonotidae (1 Genera)2 Bulbuls	<i>Pycnonotus cafer</i>	Red-vented Bulbul	R
		<i>Pycnonotus luteolus</i>	White-browed Bulbul	RM
	Muscicapidae (22 Genera)31 Babblers, Warblers, Flycatchers, Chats, Thrushs and Robins	<i>Acrocephalus agricola</i>	Paddyfield Warbler	RM
		<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler	RM
		<i>Cercomela fusca</i>	Brown Rock-Chat	R
		<i>Chrysomma sinense</i>	Yellow-eyed Babbler	R
		<i>Cisticola juncidis</i>	Streaked Fantail Warbler	R
		<i>Copsychus saularis</i>	Oriental Magpie Robin	R
		<i>Cyornis tickelliae</i>	Tickell's Blue Flycatcher	R
		<i>Dumetia hyperythra</i>	Tawny-bellied Babbler	RM
		<i>Hippolais caligata</i>	Booted Warbler	RM
		<i>Hypothymis azurea</i>	Black-naped Monarch	RM
		<i>Luscinia svecica</i>	Bluethroat	RM
		<i>Muscicapa dauurica</i>	Asian Brown Flycatcher	RM
		<i>Orthotomus sutorius</i>	Common Tailorbird	R
		<i>Phoenicurus ochruros</i>	Black Redstart	RM
		<i>Phylloscopus collybita</i>	Common Chiffchaff	RM
		<i>Phylloscopus trochiloides</i>	Greenish Warbler	RM
		<i>Prinia hodgsonii</i>	Franklins Prinia	R
		<i>Prinia inornata</i>	Plain Prinia	R
		<i>Prinia socialis</i>	Ashy Prinia	R
<i>Prinia sylvatica</i>		Jungle Prinia	RM	
<i>Rhipidura albicollis</i>		White-throated Fantail	R	
<i>Rhipidura aureola</i>		White-browed Fantail	R	
<i>Saxicola caprata</i>		Pied Bushchat	R	
<i>Saxicola torquata</i>		Common Stonechat	RM	
<i>Saxicoloides fulicata</i>		Indian Robin	R	
<i>Terpsiphone paradisi</i>		Asian Paradise-flycatcher	RM	
<i>Turdoides caudata</i>		Common Babbler	R	
<i>Turdoides malcolmi</i>		Large Grey Babbler	R	
<i>Turdoides striata</i>		Jungle Babbler	R	
<i>Zoothera citrina</i>		Orange-headed Thrush	R	
<i>Parus major</i>		Great Tit	RM	
Motacillidae (2 Genera)8 Pipits and Wagtails	<i>Anthus campestris</i>	Tawny Pipit	RM	
	<i>Anthus rufulus</i>	Paddy field Pipit	R	
	<i>Anthus similis</i>	Long-billed Pipit	RM	
	<i>Motacilla alba</i>	White Wagtail	RM	
	<i>Motacilla cinerea</i>	Grey Wagtail	RM	
	<i>Motacilla citreola</i>	Citrine Wagtail	RM	
	<i>Motacilla flava</i>	Yellow Wagtail	RM	
<i>Motacilla maderaspatensis</i>	Large Pied Wagtail	R		
Dicaeidae	<i>Dicaeum agile</i>	Thick-billed Flowerpecker	R	

	(1 Genus)2 Flowerpeckers	<i>Dicaeum erythrorhynchus</i>	Pale-billed Flowerpecker	R
	Nectarinidae	<i>Nectarinia asiatica</i>	Purple Sunbird	R
	(1 Genus)2 Sunbirds	<i>Nectarinia zeylonica</i>	Purple-rumped Sunbird	R
	Zosteropidae	<i>Zosterops palpebrosus</i>	Oriental White-Eye	R
	(1 Genus)1 White-Eyes			
	Ploceidae	<i>Amandava amandava</i>	Red Munia	RM
	(4 Genera)7 Sparrows, Weaver and Munias	<i>Lonchura malabarica</i>	Indian Silverbill	R
		<i>Lonchura malacca</i>	Black-headed Munia	R
		<i>Lonchura striata</i>	White-rumped Munia	R
		<i>Lonchura punctulata</i>	Scaly-breasted Munia	R
		<i>Passer domesticus</i>	House Sparrow	R
		<i>Ploceus philippinus</i>	Baya Weaver	RM
Orders- 17	Families- 46	No. of Bird Genera- 152	No. of Bird species- 241	

R- Resident; RM- Resident Migrant; M- Migrant.

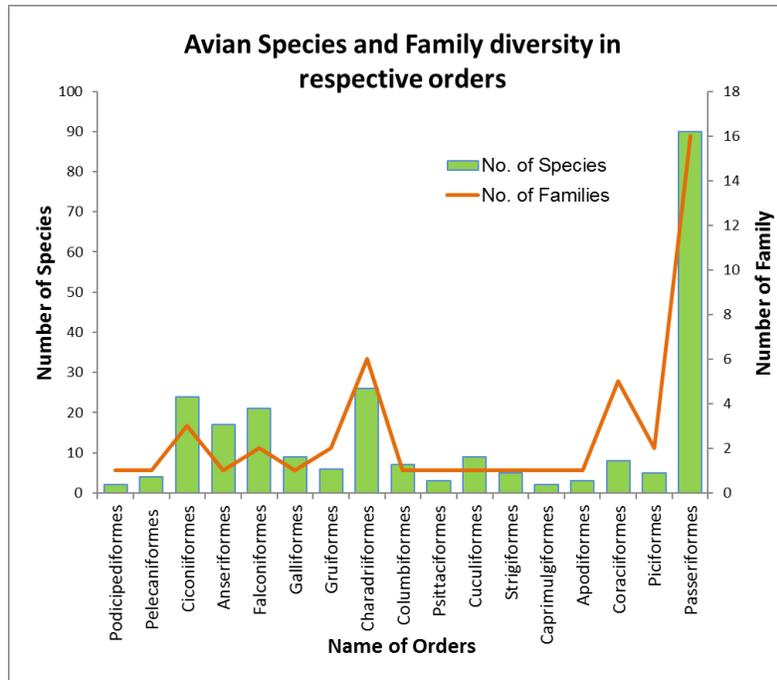


Figure 2. showing avian species and family diversity in respective orders.

Table 2. Status of Avifauna of Gosekhurd region of Vainganga basin.

S.N.	Avian species	No. of Avian species	% of Avian species
1.	Resident	109	45.23
2.	Resident Migrant	95	39.42
3.	Migrant	37	15.35
	Total	241	100

Table 3. Distribution of avifauna in respective orders and families.

S.N.	Order	No. of Families	No. of Genera	No. of Species
1.	Podicipediformes	01	02	02
2.	Pelecaniformes	01	02	04
3.	Ciconiiformes	03	17	24
4.	Anseriformes	01	07	17
5.	Falconiformes	02	14	21
6.	Galliformes	01	06	09
7.	Gruiformes	02	05	06
8.	Charadriiformes	06	16	26
9.	Columbiformes	01	03	07
10.	Psittaciformes	01	01	03
11.	Cuculiformes	01	07	09
12.	Strigiformes	01	05	05
13.	Caprimulgiformes	01	01	02
14.	Apodiformes	01	03	03
15.	Coraciiformes	05	07	08
16.	Piciformes	02	05	05
17.	Passeriformes	16	51	90
	Total	46	152	241

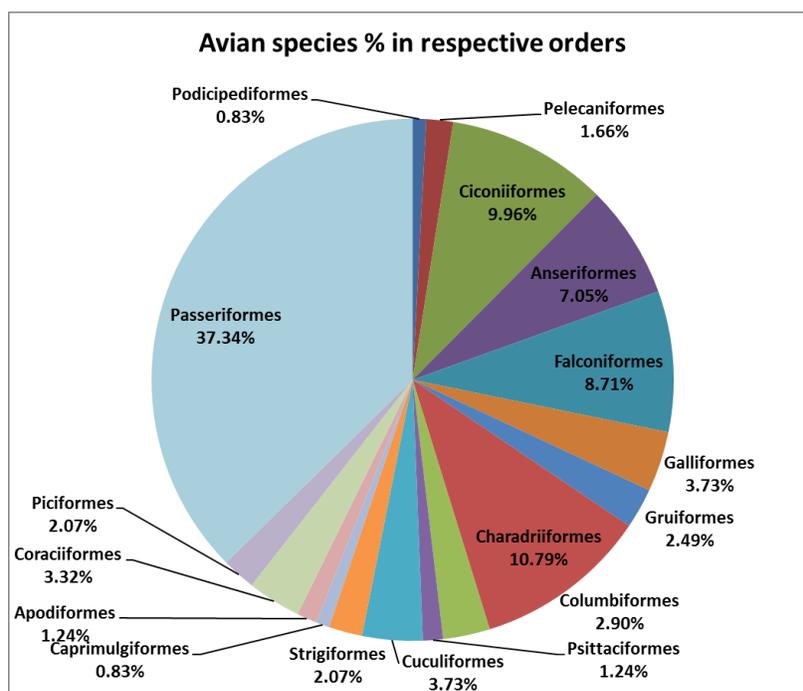


Figure 3. showing avian species percentage in respective orders.

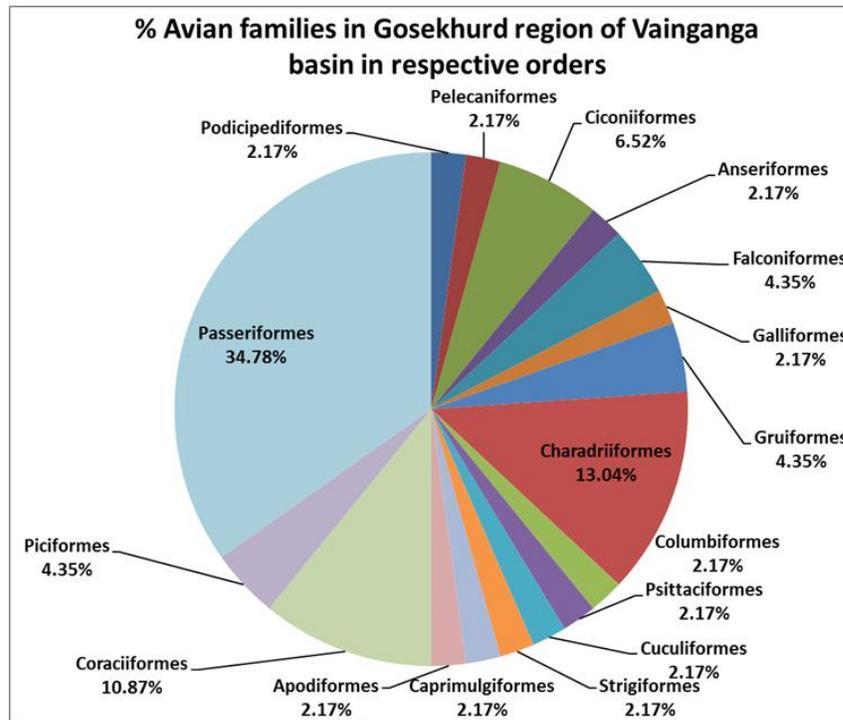


Figure 4. showing percentage in avian families in respective orders.

Discussion

In Gorewada International Park, Nagpur we were recorded 190 species belonging to 128 genera, 51 families and 17 orders. Out of 190 bird species, 89 (46.84%) species were resident, 77 (40.53%) were resident migrant and 24 (12.63%) were migratory species. The order Passeriformes is the largest order which covered 20 families out of 51 (Shende and Patil, 2015). Patil *et al.*, (2016) were reported 143 species of birds belonging to 15 orders and 41 families. Out of total 143 species 07 are migrant, 95 are Resident and 41 are Resident migrant. Seasonal variation is well marked in birds due to availability of food and nesting and suitable environmental conditions. Largest number (60) of bird species is recorded from order Passeriformes which belonging to 17 families.

Patil and Tijare (2012) were recorded 82 bird species from 11 orders and 36 families in the vicinity of Gorewada lake, Nagpur (Maharashtra). Maximum species were observed during monsoon and winter months in compare to summer months probably due to scarcity of food. They also reported 72 species belonging to 12 orders and 35 families from Borgaon near Gorewada (Patil and Tijare 2013).

Chinchkhede and Kedar (2012b) were counted 59 species of birds of which 45 were resident, 08 were winter migrants, 04 were local migrants and 02 were found to be summer migrants in

Sringar lake, near Navegaon national park. In and around Koradi lake of Nagpur, they were reported 76 species belonging to 15 orders among which 54 species were resident; 09 species were seasonal local migrant and 13 species were winter migrant. There was a gradual decline in species richness as the weather condition changes from colder to warmer. Order Passeriformes (26 species) dominated the avifauna of the Koradi lake which was followed by order Ciconiiformes (10species). The minimum diversity was recorded in the months of monsoon due to heavy rain, increased flow of water, non-availability of food and return of migratory birds (Chinchkhede and Kedar, 2012a).

While, in and around Ambazari lake, Kedar (2012) was observed 135 species of birds out of which 105 species were recorded as resident, 17 species were resident migrant and 13 were winter migrant. In Bamanwada Lake of Rajura, Chilke (2012) was recorded 58 species of birds belonging to 9 orders and 29 families. Among 9 orders Passeriformes consists of 34.48% of total families out of 29. Chilke (2012) reported 58 birds' species belonging 9 orders and 29 families in and around Bamanwada Lake of Rajura, District-Chandrapur (Maharashtra). Passeriformes is the dominating order of birds. But the future of this avian fauna is in danger due to industrial progress of the city Rajura.

Joshi and Bhatnagar (2015) recorded total 129 birds of 48 families, out of them 44 were migratory and 85 were resident. Urban habitat had least number of birds and open cultivation area had highest number of birds. The maximum numbers of birds were omnivorous guild followed by insectivorous and carnivorous guild. 15 bird species among 129 were urban dependent, 24 species were urban semi-dependent and 89 were urban independent.

Twenty eight species of wetlands birds belonging to 11 genera and 11 families were recorded from the sites of Ramaua Dam at first week December, 2016. The highest 391 numbers of bird species at site-4 and lowest 32 numbers of bird were recorded at site 3 in Ramaua dam Gwalior, Madhya Pradesh, India Lodhi et al., (2018). Patil et al., (2018) recorded 134 species birds from 16 orders and 48 Families. Out of 134 bird species 89 (66.41%) are resident, 38 (28.35%) species are resident migratory, 7 (5.22%) species are migratory and the order Passeriformes is the largest order which covered 20 families out of 48. Out of 134 bird species, 102 (76.11%) species are common, 28 (20.89%) are occasional and 4 (2.98%) are rare.

The above observations are similar to the present study where, resident birds are predominant than that of resident migrant and migratory birds; the number of birds are more during winter and Least number of birds are reported during summer and Passeriformes is the dominating order of birds.

Conclusion

The five districts of Maharashtra state which form southern two third portion of the Wainganga Valley viz Nagpur, Bhandara, Gondia, parts of Chandrapur and Gadchiroli are the largest forested areas of the state accounting for more than half (55.5%) of the total state forest area. Four out of total six tiger reserves of Maharashtra lie in these five districts. Gosikhurd

Major Irrigation Project is being constructed in the Godavari Basin in Bhandara district of Maharashtra State. It has four Lift Irrigation Schemes (LIS) namely Tekepar, Ambhora, Mokhabardi and Nerla (Paghora) to irrigate 58,422 ha (ICA). Renovation of existing Asolamendha Tank in Chandrapur district to store surplus water of monsoon from the Gosikhurd reservoir to provide irrigation to additional 52,360 ha (ICA).

The Godavari basin across Wainganga river is rich in aquatic fauna which includes micro and macro-organisms, fishes and protein-rich invertebrates and other food. This region is suitable for resting, feeding and roosting due to the abundance of natural resources. It is an important site for many resident and migratory species of birds which are excellent indicators of ecological health. Therefore, the conservation of this basin is very essential to sustain migratory and resident bird populations along with the vulnerable and threatened birds of this area.

This study will be helpful to obtain comprehensive information regarding breeding areas of resident birds, feeding areas of resident migratory birds and staging areas of migratory birds. This study will also be helpful for conservation and protection of birds.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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