International Journal of Global Science Research **ISSN:2348-8344 (Online)**
Vol.3, Issue 5, April 2016, pp. 289-294
***Available Online* at www.ijgsr.com**

Research Paper

Bird Diversity - Flying Gems and its Association with Different Environmental Zones of Limestone Quarry at Cement Plant (Clinkerisation Unit), Narsingarh, District Damoh, Madhya Pradesh

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Received: 07/11/2015
Revised: 13/12/2015
Accepted: 18/01/2016

Abstract: The state and the nature of habitat play a major role in understanding diversity and population of any species. In order to fulfill their basic needs like food, roosting and breeding etc., they search and find new habitat for their survival. The availability of diversity of birds in study area and their association with the local ecosystem depends on the various environmental factors like vegetation, quarry stones, quarry water, crops, climatic conditions etc. A study was conducted in the Limestone Quarry and Cement plant for two consecutive Seasons (January 2014 to December 2014) and species richness, density and range size distribution of birds which is found quite satisfactory. This study in the area indicates that species richness of birds is the highest at intermediate elevations along one of the most extensive elevational gradients ever examined. Additionally, primary productivity and factors associated with habitat accounted for most of the variation in avian species richness. The diversity peak at intermediate elevations and the narrow elevational ranges of most species suggest important conservation implications not only should mid-elevation areas be conserved, but the Entire gradient requires equal conservation attention.

Keywords: bird, cement plant, clinkerisation unit, limestone quarry, mine pit water, surface water, habitat vegetation, Narsingarh

INTRODUCTION

Heidelberg Cement India Ltd. Narsingarh is a Cement plant (Clinkerisation unit) with production capacity of 3.1 MTPA with limestone quarries at Narsingarh and Patharia of 1302.7 Ha and 1247.267 Ha respectively. The Plant is situated at Narsingarh, District Damoh, Madhya Pradesh. A huge plantation has been done in the Plant and in quarry area for maintaining the natural ecosystem. Tree plantation provides food and shelter to a diverse array of living creatures and micro-organisms including birds. Birds are an integral part of the ecosystem and have importance for eco-balance (Dubey,

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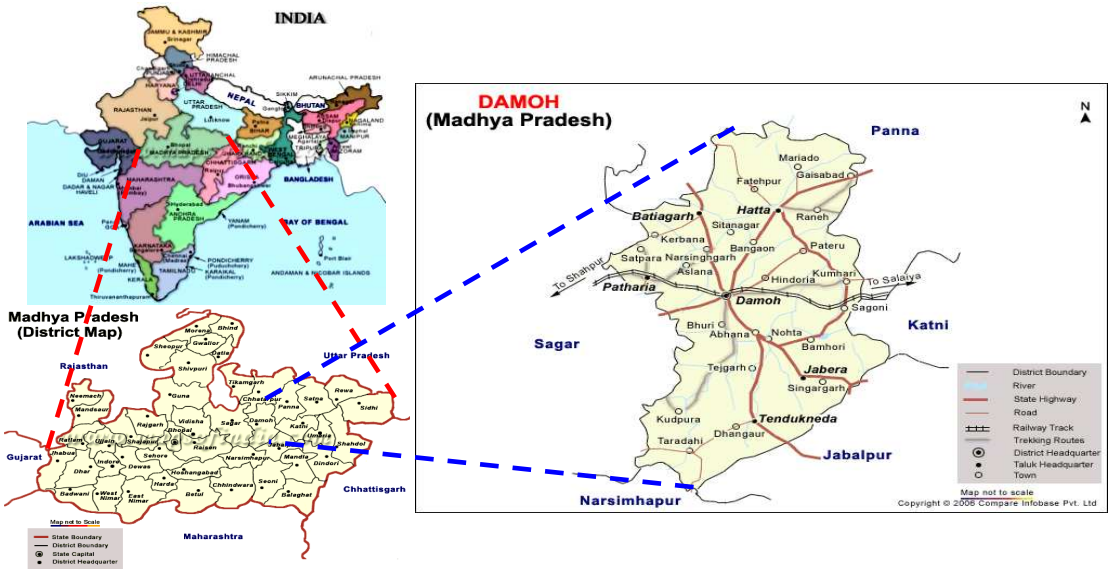
2014). Migratory birds can gain a better understanding of seasonal climate changes. By conserving birds and protecting their habitats we can continue to gain insights from our birds friends. Birds are one of the most populous life forms on the planet that biodiversity leads to a richness of life and beauty. It may be influenced by biography (Karr, 1976). Some landscape exhibit high richness in biological diversity where others show an impoverished flora and fauna. Various studies have been conducted to look at bird diversity in South Indian Forest (Joshua and Johnsing, 1986; Pramod et. al., 1997; Kunte *et al.*, 1999), relationship between birds species diversity and vegetation (Able, 1976; Terbrgh, 1985; Hawkins, 1999, Joshi *et al.* 2012), factors responsible for species distribution (Lee 2004, Bhatt and Joshi 2011, Dodia and Dhadhal, 2010; Dubey, 2014).

Biodiversity is not evenly distributed across the earth. It may be influenced by biogeography (Karr, 1976). Some landscape exhibit high richness in biological diversity whereas others show an impoverished flora and fauna (Joshi, 2012). Generally, organisms do not respond directly to the elevational gradient as such, but to variables correlated with the gradient such as climate or productivity (Terborgh, 1977; Brown, 2001). In addition, factors operating at multiple spatial and temporal scales may also influence species diversity. For example local climate, ecotones, competition, habitat structure and heterogeneity play a prominent role in determining species diversity at local level (Joshi, 2012). As elevation increases, the availability of resources for birds diminishes reflecting differences in forest stand structure, site productivity, vegetation composition, distribution pattern, secondary biotic interactions and available land area (Able and Noon, 1976; Hofer *et al.*, 1999). The numerous observations by amateur and professional bird watchers may support the idea of the value of habitat of bird diversity conservation.

In the present study, author made an attempt to study the bird diversity in the Limestone Quarry and Cement Plant (Clinkerisation unit) of Narsingarh, District Damoh, Madhya Pradesh.

MATERIALS AND METHODS



***Study area*:** Study site situated at Narsingarh, Damoh District, MP in Central India. The study site is located between $23^0$59' North latitude and $79^0$23' East longitude. Narsingarh is a small village between the banks of two rivers- Kopra and Sonar. It is about 20 kms. away from Damoh on the Damoh- Chhatarpur State Highway No.37 and is connected throughout bituminous road. The site consists of limestone quarry and Cement Plant (Clinkerisation Unit) with rich biomass and some micro and macro fauna, which support the local as well as migratory bird species. After performing the mining activity at the quarry, some of the mined out pit are being utilised for storage of rain water, where million gallons of water is accumulated. The clinker plant and limestone querry is surrounded by agricultural land where two seasonal crops are produced by the farmers i.e. Rabi and Kharif. Dense vegetation, crops, surface water availability in the mined out pit and in river Sonar and pollution free environment at the site has attracted a large number of birds in winter season. Keeping in view the previous researches and literature, it is understood that the present study site was not studied in comprehensive manner. In the light of above, it has been understood that the area is having more potential for research work and needed more attention in well-structured manner.

Some of the basic methods used in this study as described by Bibby et al. (1992) are:
a) point counts: to determine abundance by undertaking a bird count from a fixed location for a fixed period of time. The bird species seen or heard are recorded,
b) line transect: suitable for estimating density and abundance which involves moving along a fixed route (transect) and recording the bird species seen and heard on both sides of the transect. The study was conducted from January 2014 to December 2014. The bird counts were carried out in the morning from 6.00 am to 10.00 am and in the evening from 4.00 pm to 6.00 pm. Observations were carried out with the aid of Canon camera with high zoom (Canon model No EOS70D) was used to confirm the identification of the birds; nests were located by sight. For every bird species the following parameters were recorded: (i) activity of the bird when first sighted; (ii) the number of bird species at every sighting; (iii) location of nests and species involved; all the numbers were noted.
Bird watching and recording have been carried out for a period of one year from January 2014 to December 2014 and observations were made with the aid of binocular. Identification was done with the help of field guides given by Salim (1996).The study was carried out in Cement plant and lime stone quarry habitats mainly Near Admin area, Mango orchard, Near Guest House, Colonies, Narsingarh Lime Stone Mines etc. Regular surveys were done by systematically walking on fixed routes through the study area. Birds were mostly observed during the most active period of the day, i.e., from 6.00 am to 10.00 am and in the evening from 4.00 pm to 6.00 pm. Birds seen were recorded along with habitat type, season and frequency of sighting. For making the list of birds, photographs as well as visit reports and actually observed birds were used as evidence.

RESULTS AND DISCUSSION

A total 54 species of birds belonging to 34 families distributed have been

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recorded from the study area. Details such as common and scientific names, status of the birds are presented in table.

Table: Status of bird species recorded in Integrated Cement Plant and Lime Stone quarry

S.N.	Common Name	Scientific Name	Family
1.	Ashy-Crowned Sparrow Lark	*Eremopterix grisea*	Alaudidae
2.	Ashy Prinia	*Prinia socialis*	Cisticolidae
3.	Asian koel	*Eudynamys scolopaceus*	Cuculidae
4.	Asian paradise flycatcher	*Terpsiphone paradisi*	Monarchidae
5.	Asian Pied Sterling	*Sturnus contra*	Sturnidae
6.	Bay backed shrike	*Lanius vittatus*	Laniidae
7.	Black drongo	*Dicrurus macrocercus*	Dicruridae
8.	Black redstart	*Phoenicurus ochruros rufiventris*	Muscicapidae
9.	Black-shouldered kite	*Elanus axillaris*	Accipitridae
10.	Brahminy Sterling	*Sturnus pagodarum*	Sturnidae
11.	Citrine Wagtail	*Motacilla.citreola citreola*	Motacillidae
12.	Common Crane	*Grus grus*	Gruidae
13.	Common Hawk Cuckoo	*Hierococcyx varius*	Cuculidae
14.	Common Hoopoe	*Upupa epops*	Upupidae
15.	Common Iora	*Aegithina tiphia*	Aegithinidae
16.	Common Kingfisher	*Eurasian kingfisher*	Alcedinidae
17.	Common Myna	*Acridotheres tristis*	Sturnidae
18.	Common tailorbird	*Orthotomus sutorius*	Cisticolidae
19.	Coppersmith Barbet	*Megalaima haemacephala*	Megalaimidae
20.	Golden Oriole	*Oriolus oriolus*	Oriolidae
21.	Great Egret	*Casmerodius aldius*	Ardeidae
22.	Green Bee Eater	*Merops orientalis*	Meropidae
23.	Greater Coucal	*Centropus sinensis*	Cuculidae
24.	House crow	*Corvus splendens*	Corvidae
25.	House Sparrow	*Passer domesticus*	Passeridae
26.	House Swift	*Apus affinins*	Apodidae
27.	Indian Chat/ Rock Chat	*Cercomela fusca*	Muscicapidae
28.	Indian Robin	*Saxicoloides fulicata*	Muscicapidae
29.	Indian Roller	*Coracias benghalensis*	Coraciidae
30.	Indian Pond Heron	*Ardeola grayii*	Ardeidae
31.	Indian Silver Bill	*Lonchura malabarica*	Estrildidae
32.	Jungle Babler	*Turdoides striatus*	Leiothrichidae
33.	Laughing Dove	*Streptopelia senegalensis*	Columbidae
34.	Large billed crow	*Corvus macrorhynchos*	Corvidae
35.	Little Cormorant	*Phalacrocorax niger*	Phalacrocoracidae
36.	Oriental Magpie Robin	*Copsychus saularis*	Muscicapidae
37.	Pied Cockoo (Jacobian Cuckoo)	*Clamator jacobinus*	Cuculidae
38.	Pied kingfisher	*Ceryle rudis*	Cerylidae
39.	Purple Sunbird	*Nectarinia asiatica*	Nectariniidae
40.	Plum headed parakeet	*Psittacula cyanocephala*	Psittaculidae
41.	Red Wattled Lapwing	*Vanellus indicus*	Charadriidae
42.	Red breasted flycatcher	*Ficedula parva*	Muscicapidae

43.	Red Vented Bulbul	*Pycnonotus cafer*	Pycnonotidae
44.	River Lapwing	*Vanellus duvaucelii*	Charadriidae
45.	Rock Pigeon	*Columba livia*	Columbidae
46.	Rofous tailed lark	*Ammonomanes phoenicurus*	Alaudidae
47.	Rose ringed parakeet	*Psittacula krameri*	Psittaculidae
48.	Ruddy Shelduck	*Tadorna ferruginea*	Anatidae
49.	Spotted Dove	*Streptopelia chinensis*	Columbidae
50.	White Wagtail	*Motacilla. alba dukhunensis*	Motacillidae
51.	White throated kingfisher	*Halcyon smyrnensis*	Halcyonidae
52.	Yellow Crowned Woodpecker	*Dendrocopos mahrattensis*	Picidae
53.	Yellow-throated sparrow or chestnut-shouldered petronia	*Petronia xanthocollis*	Passeridae
54.	Yellow-Wattled Lapwing	*Vanellus malabericus*	Charadriidae

These bird species were found to utilize different habitats extensively for foraging, nesting and roosting on the emergent and fringed vegetation. Water birds, being generally at or near the top of most quarry water for food chains are highly susceptible to habitat disturbances and are therefore good indicators of general condition of aquatic habitats. The rich diversity of the birds documented during the present study may be because of availability of varied sources of feed as well as foraging. The birds are in general being heterogeneous in their feeding habits (Ali and Ripley, 1987). Thus birds exploit a variety of habitats and depend upon a mosaic of microhabitats for their survival. The number of occasionally birds found here is more because the climate condition, food and shelter are suitable for those particular species and also huge accumulation of rain water in the mined out pit and water of river Sonar. During the study it is observed that ample number of birds having the habitat nearby these water bodies of limestone quarry area and near to river Sonar.

Conclusion: The study proved that, if the present ecological characteristics of this site continuous, the birds were unable to inhibit this habitat in the immediate future. Proper awareness programme regarding the importance of birds and vital role in daily life to the local people through different massive programe will ultimately help the protection of birds of this region.

Acknowledgement: I acknowledge my indebtedness in the writing of this paper. I am highly grateful to Mr. J. N. Cooper, CEO & MD, Mr. S. K. Tiwari, Director Technical, Mrs. Poonam Sharma, Director H R, Mr. Ashok Sharma, Mr. R.N. Rai and other executives of Heidelberg Cement India Limited for their valuable cooperation to carry out the research work. I am also thankful to the motivators and supporters Dr. Awadhesh Kumar Pathak, Mrs. Arpna Trivedi, Mr. J. C. Jatia, Mr. C. Mathew, Mrs. L. Mathew, Mr. Tarun Verma, Mr. A. Mukharya, Mr. D. S. Vyas, Mr. R. Ganguly Mr. Shiva Kant Pandey and Mr. J. Akhtar for their regular healthy cooperation and valuable supports during the research study.

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