

# The Abundance of Avifauna in an Agricultural Landscape: A Benefit of Community Conservation Initiatives in Haryana, India

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## Abstract

Agricultural practices have the potential to negatively impact local ecosystems. Further, the clearing of native vegetation to make way for farming land could give rise to the loss of various faunal species. If properly managed, such practices have the potential to adopt a holistic approach combining agricultural produce and local species conservation. To examine such a prospective approach, the community conservation initiatives started by the agricultural village of Kanalsi, Haryana was the focus of attention. To begin with, the land use within the village and nearby areas was considered to examine the forest and agriculture dominated areas. Secondly, a survey was conducted in the month of December, 2012 to record the number of avian species present within this landscape. In total, 79 species of birds were recorded. Despite being an agriculture dominated region, the ecosystem conservation initiatives started by the local village communities had played a positive role for the protection of local avifauna.

**Keywords:** Kanalsi, Land Use, Nadi Mitra Mandal, Somb, Thapana, Yamuna

## 1. Introduction

With India's rapidly increasing population, there is a huge demand for agriculture and urban land. This has shifted the focus on to the available forest areas, especially the ones not encompassed within protected areas. For example, it has been shown that the change in total forest area in the Himalayan bio-zone alone reduced by 15% between 1970–2000, and that it would reduce further by 12% between 2000–2025<sup>1</sup>. Anthropogenic stressors such as these have resulted in habitat destruction<sup>2</sup>, and local species extinctions<sup>3</sup>. Despite an abundance of avifauna in India, various species are under threat due to poaching, loss of nesting habitats, and detrimental effects of chemicals used in both agriculture and urban practices. Also, there has been an increase in agricultural landscape to meet the growing demand for food, and this in turn has had a damaging

effect on the population of many species of birds. Within this rapidly altering scenario, there could be a possibility of utilizing a holistic approach, which would not only yield satisfactory farm produce, but also provide acceptable levels of protection to various species of birds which are struggling for their very survival. To investigate the utility of such a proposal, various agricultural communities in India need to be focussed upon. For this study, the village of Kanalsi in the north Indian State of Haryana was the centre of attention, and emphasis was placed on the community's ecosystem conservation initiatives<sup>4</sup>. The objectives of this study were to (a) determine the land use within and around the village using Landsat satellite imagery to examine forest and agriculture dominated regions; (b) record the number of bird species; and (c) highlight the various measures adopted by the community for the protection and conservation of the local avifauna.

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## 2. Study Area

Kanalsi is an agricultural village, situated near the city of Jagadhri in Yamuna Nagar district in the north Indian State of Haryana. The chief crops grown by the farmers here are sugarcane (*Saccharum*) and poplar trees (*Populus*). The major water source in the region is the Thapana River. It is a perennial river with a length of 15 km, and is formed by the convergence of four smaller tributaries, i.e., Thapana 1, 2, 3, and 4. These tributaries pass through the neighbouring villages of Nawajpur, Saundhebaas, Gaajdinpur, Mandoli Ghaggar, Jairampur, Haldari, Nathanpur, Damopura, and Mahermajra, before joining to form the main Thapana River near Kanalsi. The Thapana meets the Somb River near Kanalsi, which in turn joins the Yamuna River downstream. The Thapana River is unique in its own right. It originates from an underground stream in Haryana, and is the one river which converges into the Yamuna within the State itself. The Thapana is also one of the few remaining rivers which have struggled, but successfully managed to maintain their ecological diversity through various community conservation initiatives here. This river has multiple beneficial uses, i.e., it provides drinking water to local communities, provides water for irrigation purposes, and supports a rich faunal diversity<sup>4</sup>. There is a current drive to declare this river as a “Natural Heritage”. Despite such importance, stretches of this river outside community conservation sites continue to face various threats<sup>4</sup>. The members of the Nadi Mitra Mandal (NMM), Kanalsi through the assistance of PEACE Institute Charitable Trust, New Delhi and Thames Rivers Trust, UK have been crucial for ecosystem conservation here. Various initiatives have been started by the community members to promote organic farming, impose a ban on the use of plastic bags, prevent sand and boulder mining from river beds, and protect and conserve local biodiversity.

## 3. Methodology

The overall methodology was divided into two sections:

### 3.1 Land Use Preparation

Landsat-5 Thematic Mapper satellite image was used for the land use map preparation. Cloud-free satellite data from the year 2012 was processed to generate land use

thematic maps. A subset of satellite image was created for the study area. Training sets/signatures were collected using regions of interest and supervised classification was performed using maximum likelihood algorithm. A land use map was generated with the following 6 classes: (a) river/canal - included the river Yamuna, Thapana 1, 2, 3 and 4 with Trans-Yamuna canal passing through the study area; (b) forest - as per the forest boundaries; (c) open vegetation - included less dense vegetation with scattered trees; (d) agriculture - the cultivated region in the study area; (e) village/settlements - included the residential built-up within the study area; and (f) other land use - all other land use categories.

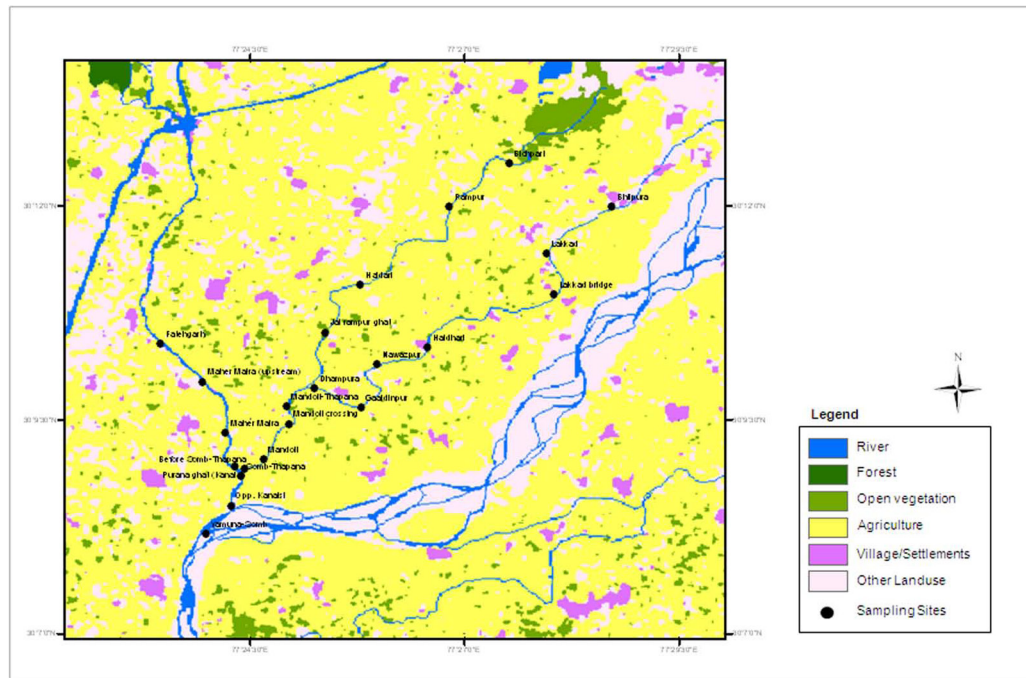
### 3.2 Recording of Bird Species

This occurred during the winter month of December in 2012 throughout the day (9am to 5pm) distributed across 22 major sampling sites (Figure 1). The birds were identified by photographing and noting individual species both during rest and in flight, using a Canon Power Shot SX210 IS 14.1MP, 14X optical zoom digital camera, repeatedly throughout the sampling period<sup>4</sup>. All specimens were identified based on the latest publication<sup>5</sup>.

## 4. Results

A land use map was generated from L-5 TM satellite imagery (Figure 1). The map showed that the land use in the study area is agriculture dominated with an area of 114.87 km<sup>2</sup>; followed by open vegetation (scattered trees and moderate vegetation) covering an area of 6.19 km<sup>2</sup>; and forests occupying an area of 0.61 km<sup>2</sup>.

Seventy-nine species of birds, (40 families; 42 orders), were recorded from the sampling sites (Table 1). Out of these, the family Ardeidae had the highest species richness with 7 species; followed by Accipitridae (6 species), and Sturnidae (5 species). The species of birds were further categorised according to their status in Haryana, India<sup>5</sup>. These were common resident (N=39); common visitor (N=1); common winter visitor (N=8); non-resident (N=1); locally common resident (N=9); locally common winter visitor (N=2); locally common visitor (N=1); not common resident (N=9); common resident/winter visitor (N=1); not common winter visitor (N=3); not common passage migrant (N=2); vagrant (N=2); and not common summer visitor (N=1).



**Figure 1.** Land use map prepared from Landsat 5 TM satellite imagery showing land use classes.

## 5. Discussion

In an environment where preference is often given to services which can be obtained from ecosystems, it is not surprising that biodiversity continues to suffer from anthropogenic stressors. Activities like agriculture are sometimes the need of the hour as there is a huge demand to feed an ever-expanding population. Avian fauna is one such victim in the hands of excessive exploration of natural resources. Birds play a multitude of roles, i.e., seed dispersal, pest control, and as top predators; but have not been able to stand their ground in the face of development. Mass awareness, information, and educating local stakeholders about the benefits associated with birds, can be some of the approaches to protect endemic species.

During the study, it was found that the bird diversity in and around Kanalsi was rich despite it being an agricultural dominant region. This can be owed to various factors. The deep understanding regarding the locally found avian species displayed by the younger members of the community highlighted the transfer of traditional knowledge from the ancestors and village elders. It was noticed that there was a sense of local pride and positive association with the avifauna. Community conservation

programmes such as the planting of native trees all around the village and near river banks was widely observed. When questioned, various respondents mentioned that not only will the trees stabilize the river banks, but also provide nesting habitats for birds and other species. The people of Kanalsi had placed clear sign boards all around the village, informing people that the area was officially protected and requesting them not to hunt or harm the birds in anyway. In areas outside the village where signs of poaching were observed, people were quickly informed about the conservation drive in the region.

A portion of *Panchayat* land was observed vacant during the survey month. When enquired, the respondents commented that the land had been left empty for a few years for various reasons and had given rise to a luxuriant growth of scrubs and grasses. The community members soon discovered that this area now provided nesting habitats for many local and migratory birds' species. This was indeed true as many species of birds were observed nesting and visiting this stretch of land during the course of the survey. We were further informed that there was an on-going drive through the community conservation programme to ensure that this land remains agriculture free for many more years. There was also an initiative by the community members to

**Table 1.** Total number of bird species (N=79) recorded, according to their Family and Order

Serial no.	Family	Order	No. of species (N)
1	Accipitridae	Accipitriformes	5
		Falconiformes	1
2	Alcedinidae	Coraciiformes	1
3	Anatidae	Anseriformes	3
4	Ardeidae	Pelecaniformes	6
		Ciconiiformes	1
5	Bucerotidae	Coraciiformes	1
6	Campephagidae	Passeriformes	1
7	Cerylidae	Coraciiformes	1
8	Charadriidae	Charadriiformes	3
9	Cisticolidae	Passeriformes	3
10	Columbidae	Columbiformes	2
11	Coraciidae	Coraciiformes	1
12	Corvidae	Passeriformes	3
13	Cuculidae	Cuculiformes	1
14	Dicruridae	Passeriformes	1
15	Falconidae	Falconiformes	1
16	Gruidae	Gruiformes	1
17	Halcyonidae	Coraciiformes	1
18	Hirundinidae	Passeriformes	2
19	Laniidae	Passeriformes	1
20	Laridae	Charadriiformes	2
21	Leiothrichidae	Passeriformes	1
22	Megalaimidae	Piciformes	1
23	Motacillidae	Passeriformes	3
24	Muscicapidae	Passeriformes	4
25	Phalacrocoracidae	Suliformes	3
26	Phasianidae	Galliformes	1
27	Phylloscopidae	Passeriformes	2
28	Picidae	Piciformes	1
29	Ploceidae	Passeriformes	1
30	Psittaculidae	Psittaciformes	1
31	Pycnonotidae	Passeriformes	1
32	Rallidae	Gruiformes	3
33	Rhipiduridae	Passeriformes	1
34	Recurvirostridae	Charadriiformes	1
35	Scolopacidae	Charadriiformes	3
36	Strigidae	Strigiformes	1
37	Sturnidae	Passeriformes	5
38	Sylviidae	Passeriformes	2
39	Threskiornithidae	Pelecaniformes	1
40	Upupidae	Coraciiformes	1

indulge in organic farming and they had been successfully promoting this to nearby villages as well. Despite the low yields and time consuming methods associated with this practice, most of the respondents acknowledged the benefits to their own health and to the associated ecosystems.

## 6. Conclusion

Interviews conducted with local stakeholders revealed that although there is a strong desire to prevent the damage being done to local floral and faunal species, the moral duty to provide the required crops for the country and oneself is crucial too. Therefore, conservation strategies based on such needs and concerns of local stakeholders, could have the potential to protect and conserve not just the birds across India, but other faunal/floral species as well<sup>4</sup>. The community conservation initiatives started by the members of Kanalsi village has not only benefitted the various species of birds in the region, but also provided a success story for neighbouring villages.

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