



**ORIGINAL ARTICLE**

**Habitat Preference and Behavior of Sarus Crane (*Grus antigone*) in Lakhimpur District of Uttar Pradesh**

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**ABSTRACT**

*Sarus crane is one of the most impressive birds on earth and an indicator of healthy agricultural land and wetland. This study between June 2015 to June 2017 was to examine the Sarus crane Preferable habitats for nesting, foraging, resting and roosting and to locate the different areas utilized for the above activities. The survey method consisted with the collection of data from primary and secondary resources. During the study, a total 86 pairs was observed in 2015, 30 in pairs is observed in 2016 and 74 pairs was observed in 2017 in 17 selected villages.*

**Key words:** habitat, foraging,; Breeding

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**INTRODUCTION**

A nest is the place where a bird lays and incubates eggs and raises its young ones. Nest-site selection is an important determinant of individual fitness in birds. Understanding what information individuals use to choose nest sites is therefore important for understanding the (Citta and Lindberg 2007). Indian Sarus crane (*Grus antigone antigone*) is the world's tallest flying bird and the State bird of Uttar Pradesh (Ansari 2015). The Sarus Crane ranges from India to Australia and has been classified as 'Vulnerable' to extinction (Bird Life International 2012). There are 15 crane species in the world, and Sarus crane is one of them. It is resident breeding crane in India. Indian Sarus crane is a worthy flagship species for the reason that it is a charismatic, and symbolic bird species inhabiting large wetland area scattered in agricultural landscapes of Uttar Pradesh and known for its marital fidelity, believed to mate for life and pine the loss of their mates even to the point of starving to death (Jha 2013 and Yaseen *et al.* 2013). Mated pairs of cranes, including Sarus cranes, engage in unison calling, which is a complex and extended series of calls where male and female vocalizations differ but are coordinated. The birds stand in a specific posture, usually with their heads thrown back and beaks skyward during the display. In Sarus cranes the female initiates the display and utters two calls for each male call. The male always lifts up his wings over his back during the unison call while the female keeps her wings folded at her sides. All cranes engage in dancing, which includes various behaviors such as bowing, jumping, running, stick or grass tossing, and wing flapping. Dancing can occur at any age and is commonly associated with courtship, however, it is generally believed to be a normal part of motor development for cranes and can serve to thwart aggression, relieve tension, and strengthen the pair bond (ICF 2017).

Nests of all Sarus Cranes consist of wetland vegetation. In India, nests located in flooded rice paddies are constructed entirely of rice stalks. Indian Sarus cranes breed primarily during the rains, with few pairs breeding outside this season in response to chick loss and creation of nesting habitat due to flooding caused by irrigation canals (ICF 2017). Sarus crane is an agricultural and wetland bird with the largest population in Uttar Pradesh; therefore in this study we summarize the ethology and nesting performance of Sarus crane in Lakhimpur District, Uttar Pradesh

## **METHODS**

Present study was carried out in four blocks of Lakhimpur district viz., Behjam, Mohammadi, Lakhimpur and Bijuwa. The intensive study made in the marshland, water bodies and agriculture fields of these blocks.

All the possible areas of Sarus habitat were surveyed. The direct observations were made through naked eyes and binocular. Local peoples residing inside the study area were also interviewed to collect the data about population, nest places, predators of chicks and eggs and home range of the bird.

### **HABITAT PREFERENCE:**

Preferable habitats for nesting, foraging, resting and roosting were observed and drawn on maps to locate the different areas utilized for the above activities. All preferable habitats were also recorded in data sheets.

### **FOOD AND FEEDING:**

Food and feeding habits were studied by direct observation. The birds were observed foraging from hidden places in feeding areas. After leaving the foraging ground, remains of the plants and insects were collected and identified to know food and feeding habit.

### **BREEDING BEHAVIOUR:**

For the study of breeding behaviour during breeding season (from month of July to October) the birds were observed in their breeding sites as they started to prepare their nests. A suitable hide was made near the nest for close observation. G.P.S. locations were also noted in each nest. During incubation, the timing spent by male or female Sarus Crane was recorded with the help of stop watch. Eggs were also marked to know the incubation period.

To know breeding behaviour every study year minimum 12 and maximum 17 nests were selected. The difference was due to availability of the nest. Each nest was checked regularly till hatching. To collect all possible data such as, size, depth and building material of nest. The weight, width and length of the eggs were measured by light balance, calipers and scale respectively.

### **STUDY AREA:**

The present study area is Lakhimpur Kheri, district of Uttar Pradesh. Lakhimpur Kheri district is situated on Indo-Nepal border close to foot hills of Himalayas in Terai area. It is a district of Uttar Pradesh in the Lucknow division. The headquarters of the District are situated in the city of Lakhimpur. It borders with Bahraich, Sitapur, Hardoi, Pilibhit and Shahjahanpur districts. Areawise it is the largest district in Uttar Pradesh. About 20% of this area is covered with deciduous thick forest. It is famous for Dudhwa Tiger Reserve. The total forest area is dominated by Sal forest dotted with open areas covered with grasses which are commonly known as "Phanta". It is home to a large number of rare and endangered species including tiger, leopard, swamp deer, hispid hare, Bengal florican, etc. Being a Terai district it is rich in natural resources with lush green scenery and many rivers. Lakhimpur Kheri district is the largest district in terms of area in the state (Total Area = 7680 sq. km). It is located at 27.60 to 28.60 N Latitude and 80.340 to 81.300 E Latitude.

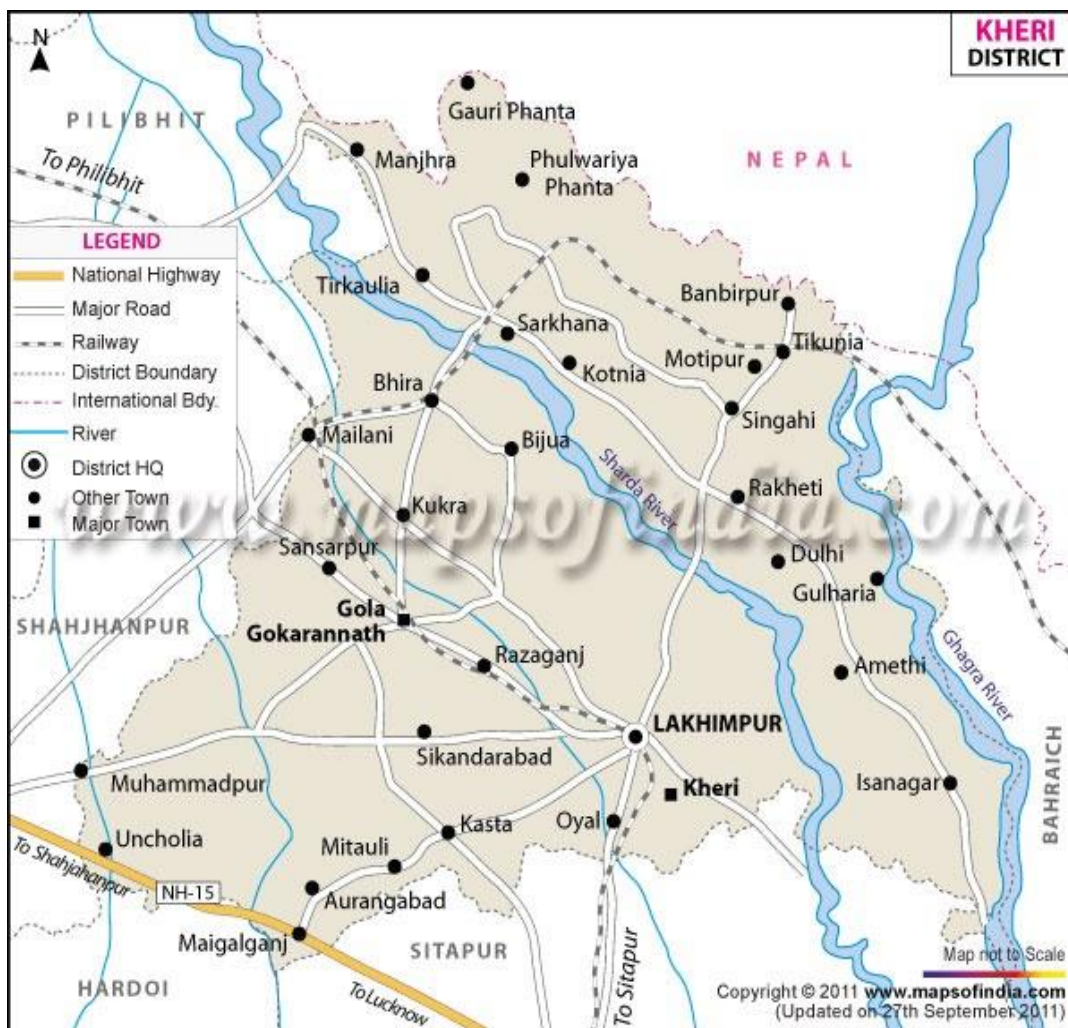


Fig 1: Map of Lakhimpur Kheri District of Uttar Pradesh

Table 1: GPS locations and area of villages with the presence of Sarus cranes

S. No.	Name of Village	Latitude	Longitude
1	Achhaniya	27°51'23.7"N	80°37'11.7"E
2	Bachhepara	27°51'56.2"N	80°37'53.8"E
3	Bhareta	27°52'41.4"N	80°39'07.2"E
4	Mukrehta	27°52'07.7"N	80°39'47.3"E
5	Umariya	27°53'35.0"N	80°37'00.6"E
6	Devipur	28°03'04.1"N	80°17'57.6"E
7	Faridpur Grant	28°02'14.6"N	80°18'25.2"E
8	Pipariya Dhani	28°00'37.8"N	80°19'05.7"E
9	Agar Aggar Khurd	28°05'09.8"N	80°40'38.5"E
10	Aggar Buzurg	28°04'43.2"N	80°40'58.4"E
11	Belawa	27°58'15.5"N	80°57'06.1"E
12	Banjaria	27°58'46.8"N	80°57'02.2"E
13	Rameshara Pur	28°16'26.3"N	80°37'54.6"E
14	Gonha	28°17'44.6"N	80°37'07.5"E
15	Kunwarpur Khurd	28°19'02.4"N	80°35'39.0"E
16	Bajhera	28°18'25.6"N	80°36'32.7"E
17	Bhira	28°19'21.3"N	80°28'50.5"E

The secondary data were collected from the published literature such as management plans, government documents, official statistics, previous studies on the Sarus crane, technical reports, scholarly journals, review articles, books, computerized databases, and newspaper articles (Shell 1997, Cnossen 1997).

### STATISTICAL ANALYSIS

Both quantitative and qualitative data were recorded and considered for statistical analysis. The standard statistical analysis procedure was used that included mean, median, standard deviation as per the requirements (Snedecor and Cochran 1994).

### RESULTS AND DISCUSSION

#### PREFERABLE HABITAT:

The Sarus Crane inhabit open wet and dry grass lands, agriculture field, marsh lands and pools, but some time they are also seen man-made wetlands during the non-breeding season. During breeding season they prefer only water logged area but in other season they used wet and dry both areas for feeding and moving. Sarus live in those wetlands which are close to human habitation. It avoids thick forest area and also avoids those wetlands which are highly interfered by human beings. Sarus used water logged area for nesting and roosting.

Irrigated agriculture field is utilized as suitable breeding ground for this outstanding glorious bird. Following types of habitats are utilized by Sarus Cranes as observed in the study area. During present study it was observed that Sarus Crane had utilized all type of habitat as mentioned below

On the basis of studies of different workers- Gole (1989), Mukherjee (1989), Singh and Tatu (2000), Vyas (2002), Sunder (2003), Author also studied in study area, percentage of habitat used have been studied in crop field, wetland and other habitat and he found more or less similar type of observations which has been shown in the table

#### AGRICULTURE FIELDS:

Sarus Cranes prefer to live in agriculture fields. During winter season they utilize wheat fields for feeding and resting purposes, while in rainy season (peak of breeding season) they prefer paddy fields for nesting and foraging.

#### WETLANDS:

Wetlands are the natural habitat of the Sarus Crane (Fig. 5.6). Wetlands, which are in the form of marshes, swamps, flood plains, bogs and shallow ponds. The total natural habitat provides biodiversity, which have in abundance the food for the birds. The area is also suitable for protection due to water logging.

**Table 2:** Different types of habitat used by Sarus Crane

Agriculture fields			Wetlands	River/Canal	Barren lands	Activities
Paddy	Wheat	Other				
++	--	--	++	---	--	Nesting
++	++	++	++	++	+	Foraging
++	--	--	++	++	---	Roosting
++	++	++	++	++	----	Resting
++	++	++	++	++	++	Moving

**BARREN LAND:**

Sarus were also observed in barren land as alternative habitat during dry season. During summer when wet lands and marshy areas were completely dried Sarus occasionally moving in this area.

**FOOD AND FEEDING:**

The foods of Sarus Crane are mainly available in marshes, water logged area and agriculture fields. It varies on the basis of availability of food. Being a omnivorous bird; it can feed both vegetative food as well as animal food. It mainly feeds on tubers of marsh plants which have high nutritive value. These tubers were analyzed in the agriculture lab and found that it have nutritive value. On the basis of analysis of Cyperus tuber (100 gm.) have all the important food contents, like carbohydrate, protein, fat, fiber and ash.

**Table 3:** Showing nutritional elements of 100 gm. Cyperus tuber

Nutritional Element	Value
Carbohydrates	27.5 gm.
Protein	2.5 gm.
Fat	0.5 gm.
Fiber	13.0 gm.
Ash	5.3 gm.

**DAILY ACTIVITY**

The birds were followed from sunrise to sunset in the study area to know daily activities. The observations were also tried to make in the night but the results were not fruitful. The daily activities are categorized as follows-

- a. Foraging
- b. Preening
- c. Resting
- d. Others

**a. FORAGING:**

The Sarus pairs used to forage in the marshy area but they also forage in both cultivated and uncultivated areas. Generally foraging started from 15-20 minutes before the sun rise and stopped soon after the sun set. But in some cases it was also observed that during early moon night they forage 30 to 40 minutes after sun set.

The time of foraging is different in season to season. During heavy rains Sarus used to stop their foraging whereas this activity continued during drizzle and light rain.

**b. PREENING:**

Next to foraging preening was the most important activity of the Sarus. It takes place after the long period of foraging. The preening behaviour observed in both incubated and non-incubated Sarus.

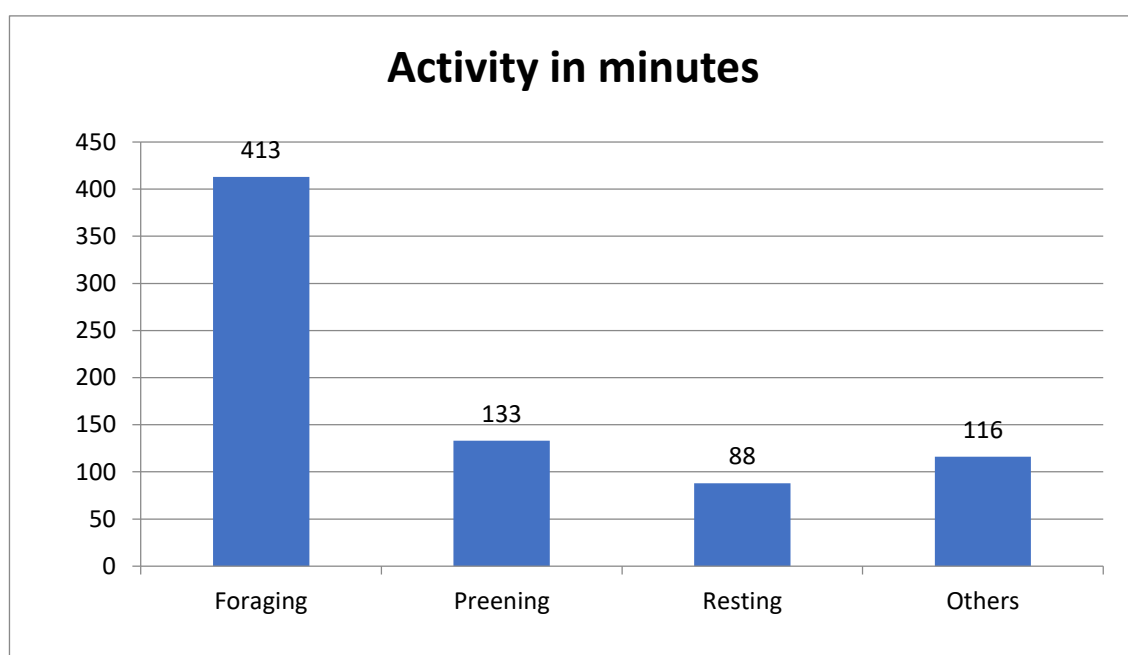
The Sarus Crane has elastic neck which can move in all directions. It helps beak in preening and keeps all body feather healthy and removes foreign materials. The process of preening is cleaning and arranging of feathers through bill. The uropygial gland found on top of the tail which secretes oil for condition of feathers. Sarus Crane spends a lot of time caring for them by preening. It was observed that maximum preening performed by incubated Sarus. It was also observed that soon after rains, Sarus used to preen vigorously, to clear all the feathers from moisture.

**c. RESTING:**

Resting mostly observed in mid-day. But it was also reported in morning and evening. Morning and evening resting take place in summer season. Morning and evening resting not to exceed 10 to 15 minutes but mid-day resting exceeded 30 to 50 minutes. In summer season the day was hot and sunny so the Sarus stop their activities for some time and get possession at a cool and safe place. They stand in opposite direction to each other. When the Sarus have juveniles then they rested in between the parents. Generally the resting noted after a long period of foraging. After the resting preening certain take place.

**d. OTHER ACTIVITY:**

Apart from foraging, preening and resting Sarus spent some time in others activity such as standing and walking. This behaviour observed during the presence of any threat. This behaviour also reported when any predator or any associate bird disturbed him. It is exceeded 5 to 15 minutes. The observations were also made per minute between 6:00 AM to 7:00 PM with the help of two other workers, which was observed for 5 to 6 times.



**Graph 1:** Showing the different activity in a day (between 6:00 am to 7:00pm)

**BREEDING BEHAVIOUR**

The sarus breed mainly during the monsoon in India. In study area, the breeding season of Sarus Crane was observed in months of July to October. All these four months of monsoon period of lakhimpur district. These months provide good conditions for breeding of Sarus such as normal temperature, high humidity, suitable nesting place and cloudy weather. Out of these four months, the month of August is the peak breeding period. In this period all wetlands and flooded area covered by water which is main breeding site of Sarus.

After the hot period of May and June when the rain start the Sarus produce a loud breeding calls and nuptial dance seen regularly. The cloudy weather initiates breeding activity.

Similarly Baker (1930) describe the habit of the Sarus crane and found that birds activities are restricted to day time and its habit vary according to season and locality. The other activities like feeding, breeding and other general habits have same observation with other workers, like Mukherjee (2001, 2002), Gole (1989), B.C. Chaudhary (2003),

Sarkar, Upadhyay, Chauhan et.al. (2013). Overall the main and pioneer contribution was presented by Saleem Ali (1997).

**Table 4:** Showing breeding pairs in different year

Different months of a year	No of breeding pairs observed in different year		
	2015	2016	2017
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	02
July	21	0	23
August	27	04	29
September	19	11	13
October	16	09	07
November	03	06	0
December	0	0	0
Total	86	30	74

The breeding behavior of the Sarus crane was well studied and it was found there is well marked breeding season during the rainy season i.e. from July to October. Ali (1940), Balkishnaw (1973) mentioned the breeding in September. The Iqbal (1992) observed breeding in August month. Mukherjee (1999) described the start of breeding from month of June to October. Whereas the studies of Singh and Khan (1989) is similar to author i.e. from June to October. There may be small variation due to variation in the rains. But there was no supplementary breeding as mentioned by Singh and Khan (1989, 1992). During breeding season which is related to the monsoon most of the pairs breed as the rain starts. It was observed that the climatic condition restrict breeding behavior in the study area. This variation was also observed by the different workers Kulshreshtha (1989) Gole (1989), Akhtar (1986-1989), Kaur and Chaudhary (2003), Mukherjee (2002), Rahmani and Iqbal (1992) and Sunder (2009). There were many similarities between present study and other workers.

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