



## NESTING BEHAVIOUR AND CURRENT THREATS TO THE INDIAN SARUS CRANE AROUND ALWARA LAKE OF DISTRICT KAUSHAMBI (U.P.), INDIA

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**Abstract:** The Indian Sarus crane (*Grus antigone antigone*) is a monogamous, graceful water bird, well known as an eternal symbol of unconditional love, devotion and good fortune with a high degree of marital fidelity. Its occurrence represents a healthy wetland ecosystem. A systematic study was conducted from June 2019 to May 2020 in the villages adjoining the Alwara Lake of district Kaushambi (Uttar Pradesh), India to explore the nesting behaviour and current threats to the Sarus crane. During the study, a total number of 43 nests were encountered in the study area. The nests were seen on large wetlands, uplands, paddy fields, scattered irrigation ditches, adjoining areas of Lake etc. around the human settlements. These birds preferred to use local flora in constructing the nests, many of them with medicinal values. The main threats include the egg destruction by predator animals and indirect anthropogenic activities; however farmers tolerate the cranes nesting in their productive sites, despite the considerable crop damage.

**Keywords:** Alwara Lake, Conservation, Nesting materials, Sarus crane, Threatened, Wetland.

### INTRODUCTION

Birds are common inhabitants of our ecosystem. Occurrence of Sarus crane and other birds represents a healthy, green and rich ecosystem from biodiversity and other resources point of view. As far as the biodiversity is concerned, it is the 'foundation of human life' on earth that must be maintained at any cost (Verma and Prakash, 2020) Conservation of avian species with environmental ethics is now a big challenge for us (Ashok, 2019; Balwan and Saba, 2020).

The Sarus crane is the only resident and non-migratory breeding crane of Indian subcontinent. They eat aquatic plants, invertebrates, grains, small vertebrates and insects. The Sarus crane has now been declared as 'State Bird' by the Government of Uttar Pradesh. Sundar and

Chaudhary (2003) gave the literature review of Sarus crane in detail while Archibald *et al.* (2003) gave the first comparative review of three subspecies of Sarus crane namely the Indian Sarus crane, *Grus antigone antigone*, Eastern Sarus crane, *Grus antigone sharpii* and the Australian Sarus crane, *Grus antigone gillae*. Due to its declining number at global level, the Sarus crane has been listed as threatened *i.e.* vulnerable avian species (Bird Life International, 2016).

Sarus crane is the tallest flying bird with a standing height up to 6 feet and wingspan up to 2.5 m. It has a grey plumage with a naked red head and upper neck and pale red legs but males are typically larger than females. Sarus is a social creature, found mostly in pairs or small groups. The Sarus crane is famous for high degree of

marital fidelity as they pair for lifelong and made for each other (Ashok, 2016; Verma, 2018a; Prakash and Verma, 2016a). They have a strong correlation with agriculture specially paddy ecosystems (Verma, 2018b).

The population of Sarus crane is decreasing globally but it is increasing continuously at local level in and around the Alwara Lake of district Kaushambi, India (Verma *et al.*, 2015; Verma and Prakash, 2016a, 2016b, 2018a, 2018b, 2019; Prakash and Verma, 2019). Kumar and Kanaujia (2017) and Tomar and Chouksey (2018) studied the nest site selection and nesting behaviour of Sarus crane in different parts of Uttar Pradesh. Prakash and Verma (2016b) and Verma and Prakash (2016c) have worked on the suitable selection of nesting materials and their medicinal values by this crane but its nesting behaviour around the study area is still unexplored.

Nest is a place where a bird lays and incubates eggs and raises its young ones. Selection of proper nest site is a critical part of bird's breeding biology, especially for wetland birds such as sarus crane. Nests are constructed on water in natural wetlands or in flooded paddy fields. Paddies have become more desirable habitats for the cranes because nesting sites are situated in proximity to areas with an abundance of food. In the present site, studies on nesting behaviour have not been reported as mentioned in the literature. Therefore authors conducted the present study from June 2019 to May 2020 to explore the nesting behaviour and current threats to the Indian Sarus crane in the villages adjoining to the Alwara Lake of district Kaushambi (Uttar Pradesh), India.

## MATERIALS AND METHODS

### Study Area

The Alwara Lake is a natural lake (Fig. 1), located in Sarsawan block of Manjhanpur tahsil of district Kaushambi of Uttar Pradesh. This is a part of perennial marshy wetland, situated between the latitude 25°24'05.84" S – 25°25'10.63" N and longitude 81°11'39.49" E-81°12'57.95" W with altitude MSL- 81.08 meter. It is surrounded by agricultural fields and is connected to the river Yamuna and Kishanpur lift canal and covers several hundred hectares. The lake is skirted by villages like: Koripur, Ranipur, Dundi, Hatwa and Bhawansuri in the east, Paur Kashi Rampur,

Alwara and Gaura in the north, Shahpur, Umrawan in the south and Mawai, Tikra and Dalelaganj in the west. The systematic study was done in all the villages adjoining the lake including Ranipur, Hatwa, Paur Kashi Rampur, Alwara, Gaura, Shahpur, Mawai, Koripur, Tiwari purwa and Tikra.



**Fig. 1: A view of Alwara Lake, district Kaushambi (U.P.), India.**

### Data Collection

Field work was done from June 2019 to May 2020. All the 10 villages mentioned above were selected for survey because the Sarus crane inhabits there whole year. The Sarus cranes breed typically during the rainy season, between the months of June and September, rarely during November and December. Multi-stage random sampling was used to all the selected villages to study the behaviour (Altmann, 1974).

The survey was done to assess the current status of habitat, nesting behaviour, food resources and current threats faced by Sarus crane. Field observations cover the agricultural fields, wetlands and ponds. Authors visited these places several times early in the morning and late evening in the all the selected villages.

Authors used binocular, NIKON D750 DSLR camera, motorbike, field stick, Chappu boat, Dongi etc. for various purposes. Besides actual sightings, inquiries from local people were also made to ensure the estimate of existing nests, eggs and their perceptions about the existence of the crane. All the observations were made while moving through the motorbike, Chappu boat, Dongi and walking along the croplands, mud lands, natural areas.



## RESULTS AND DISCUSSION

Sarus cranes mostly occur in pair (Fig. 2). They show courtship behavior to attract a receptive mate (Fig. 3), make calls during courtship and this call continues even during feeding in a flock. Cranes were seen dancing and singing in the breeding season to attract their mates. They exercise a loud trumpet call. All cranes engage in dancing, which is commonly associated with courtship. It includes the exhibition of different behaviors such as bowing, jumping, running, stick or grass tossing and wing flapping. Besides courtship, dancing can occur at any age however, it is believed to be a normal part of motor development for cranes and can serve to thwart aggression, relieve tension and strengthen the pair bond. When a flock of Sarus crane feeds in a marshland and agricultural field and other cranes are passing in flight over this group, both the flock give a note call to each other. In the groups, cranes pronounce it for attracting their mates and also make this call to show aggressive behavior. The male starts to dance and

makes a tone to attract the female. During dancing the crane shows jumping and bowing movement. They move their back and tail upward with its long bill in upward direction making matting calls (Tomar and Chouksey, 2018).

Sarus crane starts making their nests 12-15 days before egg laying. Both partners of pair are involved in the collection of the nesting materials and nest construction (Mukherjee *et al.*, 2000). Its breeding season coincides with heavy rainfall in monsoon between the months of June and September. Paddies, bunds of paddy fields and water bodies near paddy fields have become more desirable habitats for the cranes because nesting sites are situated in proximity to areas with an abundance of food (Fig. 4-7). Sarus cranes, though likely to use wetlands adjoining flooded rice paddies, also have the ability to make use of drier habitats relative to other crane species. They have also adapted well to the increased presence of human activity (Yaseen *et al.*, 2013).



Fig. 2: Sarus crane pair in paddy field in the study area.



Fig. 3: Sarus crane pair showing courtship behaviour in the study area.



Fig. 4: Nest of Sarus crane with two eggs on water body in the study area.



Fig. 5: Nest of Sarus crane with two eggs near water body in the study area.





Fig. 6: Nest of Sarus crane with two eggs on land near the paddy field.



Fig. 7: Nest of Sarus crane with single egg on land near the paddy field.

The nests of crane were present in the marshland, paddy field and in the pond. Authors recorded 43 nests in 10 villages under study (Table 1; Fig. 8).

Table 1: Village wise record of nests.

S. No.	Village	N*
1.	Ranipur	4
2.	Hatwa	2
3.	Paur Kashi Rampur	6
4.	Alwara	10
5.	Gaura	2
6.	Shahpur	2
7.	Mawai	2
8.	Koripur	6
9.	Tiwari purwa	4
10.	Tikra	5
	<b>Total</b>	<b>43</b>

\*N is the number of nests observed.

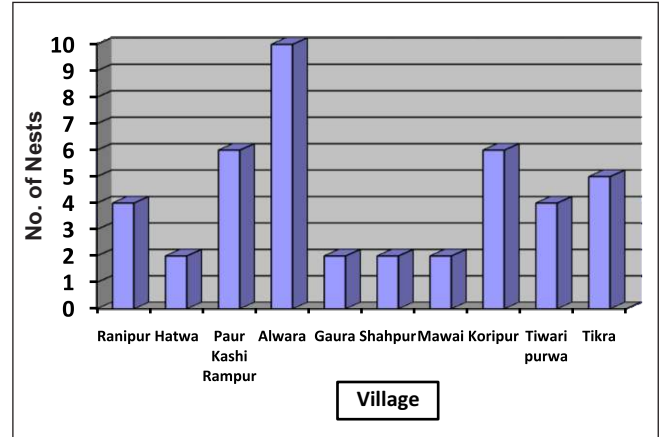


Fig. 8: Bar diagram to show number of nests observed (village wise) during 2019-20.

Bird movement during survey, provided evidence of nesting and guided the authors to search for the second bird. In most cases, the second bird was found in the vicinity, attending the nest. Whenever authors found a nest, the breeding status of the observed pair was determined through close examination of the site. Additional information about nest, eggs and adult birds was gathered by interviewing local people. All the nests were visited at least once a week until the family left their nesting territory. The number of eggs, number of chicks, parental activity and nest condition were recorded. Usually a clutch has only one or two eggs, which are incubated by both parents for a period of 26 to 35 days. The juveniles follow their parents from the day of birth (Fig. 9). Young birds attaining the height of their parents and confirmed free-flying were considered fledged (Borad *et al.*, 2002).



Fig. 9: Crane pair with two juveniles.

The nests of varying size are usually made by using both aquatic and terrestrial vegetation. Nest is simple, round in shape with slight depression in the middle. The cranes used local flora of 21 species belonging to 11 families in nest building in the study area. All these 21 plant species have some medicinal values. These plant species act as mosquito and snake repellent and were having natural anti-oxidants, antibacterial, cytotoxic, antiviral, antifungal and fungicidal properties (Verma and Prakash, 2016c; Prakash and Verma, 2016b). It was also observed that the cranes used specific shrubs and herbs for protection of health, hygiene and sanitation as well as defense (Swapna *et al.*, 2011; Mukherjee *et al.*, 2014). During the study, the nests were seen in neat and clean condition. Droppings were not there in any nest which means they do not defecate in the nest.

During nesting, these birds behave as territorial species. Authors noted that they were very protective and act with aggression to any intruders. Breeding pairs stay close to areas with appropriate water supply. Non-breeding pairs flock together in larger wetland areas. This increases the interaction between the cranes and the likelihood of an individual finding a suitable mate. Despite the territorial behavior of breeding pairs, Sarus cranes form larger flocks during the non-breeding season. Flock size usually depends on the area of the wetland. Within these flocks, the birds feed and roost (Sarkar *et al.*, 2013; Animal Diversity Web, 2021).

Water diversions and unsustainable conversion of wetlands, habitat loss, poisoning, increased anthropogenic activities, collisions with power lines, invasive species and changes in agricultural practices and ignorance of wild life rules and regulations are the major threats of this graceful bird (International Crane Foundation, 2021). As a result, the number of Sarus crane is gradually decreasing at global level. Due to its declining number, Indian Sarus crane has been listed as globally threatened *i.e.* vulnerable avian species (Bird Life International, 2016).

The authors visited the villages concerned a number of times at least two days per month since

2014, contacted the people and told as well as convinced them spiritually not to kill or hunt the Sarus cranes, their eggs and juveniles. The authors organized awareness programs regularly with local people. They were detailed about legal aspect, protection, conservation and maintenance of its natural habitat (Prakash and Verma, 2016c). As a consequence of it, authors do not found any conflict between local people and Sarus crane in the study area and farmers were seen to tolerate for cranes nesting in rice paddies, despite the considerable crop damage caused by the birds. Due to all these efforts, crane population is increasing continuously at local level in and around the Alwara Lake of district Kaushambi, India.

During study, authors noted that the presence of abundant paddy fields, land under irrigation, vegetation at the edge of the crop fields, type of crops grown, marshy wetland and the openness of habitat are the major factors for the existence and survival of Sarus crane. Moreover, decrease in pollution level and reductions in harmful anthropogenic activities are other significant factors. Several positive efforts initiated by authors as stated above, proper management and awareness campaigns finally led such a situation of increasing trend. The Alwara Lake is not only a favourable site for Sarus crane but also support a wide variety of flora and other fauna as well. The authors strongly recommend the Ministry of Environment, Forests and Climate Change, Government of India and Uttar Pradesh for the declaration of the entire Alwara Lake as "Sarus Sanctuary" for the conservation of it. It will save the genetic resources of Sarus crane and other biota from the danger of extinction.

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