



A Study on the Population Scenario of Indian Sarus Crane (*Grus antigone antigone*) in and around Alwara Lake of District Kaushambi (U.P.), India

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Authors' contributions

This work was carried out in collaboration with both the authors without any dispute. Both authors AKV and SP designed the study, wrote the protocol and first draft of the manuscript. Author AKV managed the literature searches, analyses of the study performed and the author SP managed the experimental process. Both the authors read and approved the final manuscript.

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ABSTRACT

The Indian Sarus crane, *Grus antigone antigone* is one of the most graceful, monogamous, non-migratory, and tallest flying bird of the world. Pairing for lifelong and lionized legendary marital fidelity, for which the species has garnered global popularity. This is the only resident breeding crane of the Indian subcontinent that has been declared as 'State Bird' by the Government of Uttar Pradesh, a state of the Indian Republic. However, due to the shrinking of wetlands at an alarming speed in the country, the population of this bird has become vulnerable. Present exploration is aimed to study the population of sarus crane in the year 2016 in and around the Alwara Lake of district Kaushambi (Uttar Pradesh) India and their comparison to sarus crane population recorded in 2012 and 2015 in the same study area. This comparison reflects an increasing population scenario of the bird in the

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area studied. It has been observed that the prevailing ecological conditions of the lake, the crane friendly behaviour of the local residents and awareness efforts of the authors have a positive correlation in the conservation and increasing population trends of this vulnerable bird. This conservation model can, therefore, be applied elsewhere for the conservation of other such species. Moreover, the authors strongly recommend continuous population census of this bird and declaration of the entire Alwara Lake as *Sarus Sanctuary* to make it safe zone for the conservation of Sarus crane.

Keywords: Alwara Lake; conservation; population census; Sarus crane; wetland.

1. INTRODUCTION

The Indian Sarus Crane, *Grus antigone antigone* [1] is the largest of the crane species found in the Indian subcontinent and prefers to inhabit close to human habitation. Its population density is inseparably associated with wetland habitats. It belongs to phylum: Chordata, class: Aves, order: Gruiformes and family: Gruidae. There are 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*. [2] gave the literature review of sarus crane in detail while [3] gave the first comparative review of these three subspecies. The name "Sarus" has its origin from Sanskrit word- 'sarasa', which means 'lake bird' and the dance of the sarus has undoubtedly led to the species getting the name. [1] named it as *antigone* in 1758.

Due to widespread reductions in the extent and quality of their wetland habitats, exploitation and the effects of pollutants, unplanned farming, irrigation and non-adoption of wildlife rules and regulations as well, the number of sarus cranes is gradually decreasing at global level. Due to its declining number, Indian sarus crane has been now listed as globally threatened *i.e.* vulnerable avian species [4].

A few investigators [5-7] have tried to study the demography, ecology and status of Indian sarus crane on large scale in Uttar Pradesh. As far as the study of this sarus crane from demographic and conservation point of view, in and around the Alwara Lake is concerned, it is done only by few Zoologists like [8-9] and [10-13]. [14] and [15] worked a little on the nesting materials, their medicinal values and suitable selection of nesting sites of this crane.

Present exploration is aimed to count the number of sarus crane in the year 2016 in and around the Alwara Lake of district Kaushambi (Uttar

Pradesh), India and their comparison to sarus crane population recorded from 2012 to 2015 in the same study area.

2. MATERIALS AND METHODS

2.1 Study Area

The Alwara lake (Fig. 1, Google map) is a natural lake (Fig. 2) and a part of perennial wetland and is 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 connected to the river Yamuna and covers more than 1750 hectares. It is located in Sarsawan block of Manjhanpur tahsil of Kaushambi district of Uttar Pradesh. The lake is skirted by villages like; Ranipur, Dundi, Hatwa and Bhawansuri in east, Paur Kashi Rampur, Alwara and Gaura in the north, Shahpur, Umrawan in the south and Mawai, Tikra and Dalelaganj in the west.

2.2 Climate

The weather around this lake is tropical to subtropical with some variations over the year. Winter season occurs between late October and February but mid December to mid January is the season of severe cold and irregular appearance of fogs. Spring season occurs usually from mid February to end of April. Summer season comes in the month of March and ends in late June. It is marked by high velocity winds including heatstroke. In local and vernacular language it is called *loo*, which is a strong, hot and dry summer afternoon wind from the west which blows over the western Indo-Gangetic plain region of North India. It is especially strong in the months of May and June. Rainy season starts from late June to early October. Approximately 350 mm rainfall observed annually but irregularity in rainfall is also noticed year wise which influences the landscape ecology of the lake. Autumn season

commences in mid October and ends in late November. Temperature shows with high fluctuation over the year and noticed determinant parameters of this landscape.

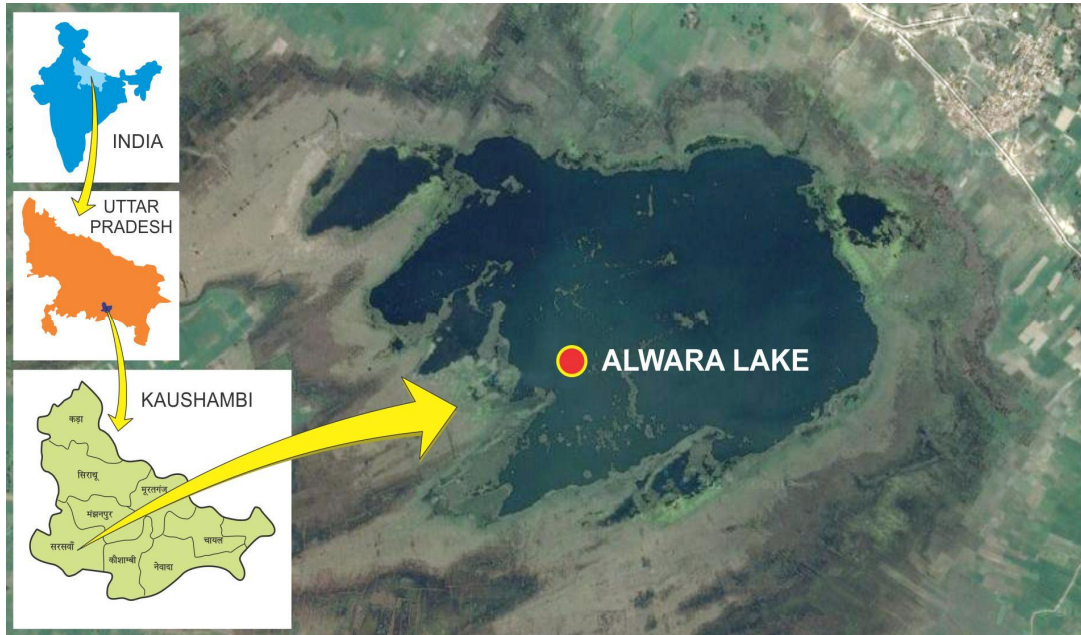


Fig. 1. Study area in Kaushambi district of U. P. (India)



Fig. 2. A view of Alwara Lake of Kaushambi, U.P. (India)

2.3 Study Pattern

Authors used binocular, camera, motorbike, *chappu* boat, field stick etc. for various purposes. Since sarus crane is a huge bird and visible from a distance hence sarus count was easy. The study area was visited regularly but the counting of sarus crane was done during first and third Sunday of every month in the year 2016. This counting was accomplished on a single day to avoid the possible double counting due to local movements of the birds to neighbouring habitat. Authors recorded cranes in maximum number during first Sunday of June 2016 as they remain confined around the wetlands in search of water. Besides actual sightings, inquiries from local people were also made to ensure the estimate of existing population and their perceptions about the existence of the crane. All the observations were made while moving through the *chappu* boat and walking along the croplands, mud lands, natural areas using binoculars (7x35 and 8x40-BEZIF BM-9) and canon cameras.

Counting procedure, identification and other demographic parameters were aided by using

standard guides such as [16-17] and methods adopted by [7,18-19].

3. RESULTS

Authors recorded 575 cranes in the present survey in and around the Alwara Lake during first Sunday of June 2016. [8] counted a population of 335 cranes in 2012 in three different transects of Alwara lake; [11] counted their population as 425 in 2013; [12] reported 510 cranes in 2014 and [13] recorded 537 cranes in and around Alwara Lake in 2015. The result obtained during this survey in 2016 along with other results from 2012 to 2015, is depicted in Table 1 and bar diagram (Fig. 7).

Sarus cranes are seen mostly in pair (Fig. 3) or in pairs with juvenile (Fig. 4) and rarely in solo condition (Fig. 5). The family group occurs in whole year but during non-breeding season, cranes are seen in congregation (Fig. 6) mostly in evening for mate finding or pair formation. [9] reported a congregation of 155 cranes in 2014.

Table 1. Year wise population scenario of sarus crane from 2012 to 2016

| No. of cranes in 2012 | No. of cranes in 2013 | No. of cranes in 2014 | No. of cranes in 2015 | No. of cranes in 2016 |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 335 | 425 | 510 | 537 | 575 |



Fig. 3. Paired sarus crane in study area around Alwara Lake



Fig. 4. Sarus crane pair with juvenile in agro paddy field around Alwara Lake



Fig. 5. Sarus crane in solo around the study area

4. DISCUSSION

Alwara Lake is an old marshy natural wetland situated in the tropical part of India. Its wetland

has valuable biotic resources. It is not only a favourable site for sarus crane distribution but also support a wide variety of other fauna and flora.



Fig. 6. Sarus crane in congregation in evening around the study area

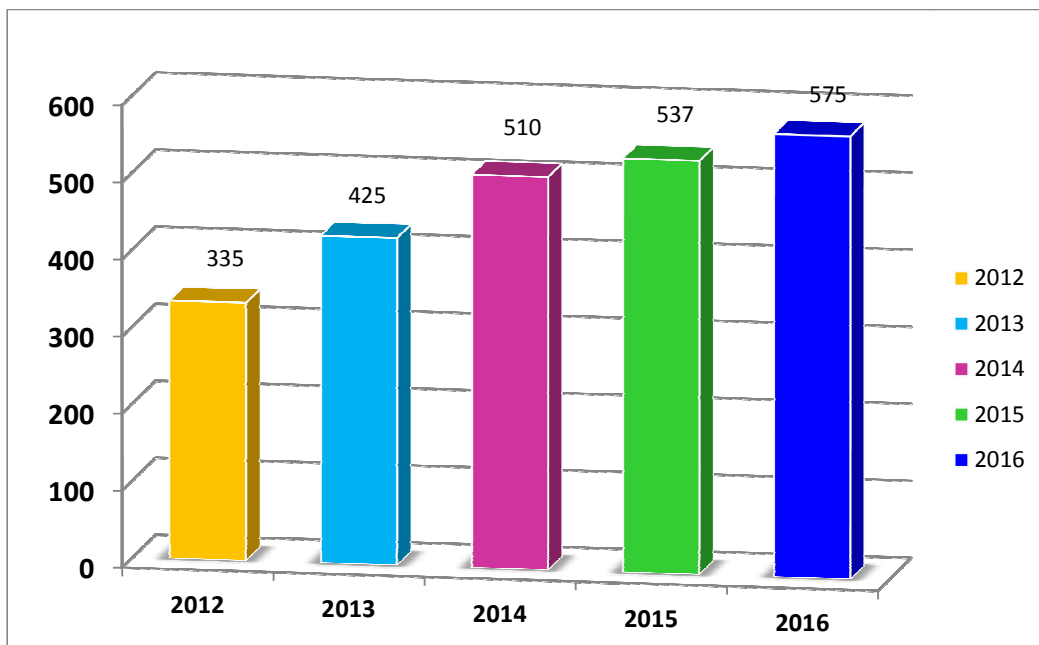


Fig. 7. Bar diagram to show year wise population of sarus cranes from 2012 to 2016

Globally the sarus crane is threatened i.e. vulnerable avian species [4,20]. due to widespread reductions in the extent and quality of their wetland habitats, huge exploitation of natural resources, unplanned farming, increased anthropogenic activities, pollution and non-adoption of wild life rules. But in study area, its increasing trend is observed from 2012 to 2016, as clearly shown by Table 1 and bar diagram.

The species studied is benefiting from agricultural land with increased food resources and availability of suitable nesting sites. The authors observed that the presence of inundated

paddy fields, land under irrigation, vegetation at the edge of the crop field, type of crop grown, wetland and the openness of habitat are the major factors for the existence and survival of sarus crane. There are almost negligible anthropogenic activities and other factors such as hunting and capture of eggs that leads to population reduction.

The authors and their team visited the villages concerned a number of times especially on first and third Sunday of every month, contacted the people and told as well as convinced them not to kill or hunt the sarus cranes, their eggs and

juveniles. The authors organized awareness programme with group of local people and continued it even when 1 or 2 villagers were there. They were trained about the safety of this sarus dominating zone and not giving permissions to outsiders who can cause any direct or indirect harm both to crane as well as its natural habitat. Legal aspect of this sarus crane was also explained several times and it was demonstrated that how it influences the food chain, food web and biodiversity of this particular place. Importance of its protection, conservation and maintenance of its natural habitat were also emphasized [21].

5. CONCLUSION

In the present study, a continuous gradual increase is clearly observed, as indicated in the table and bar diagram. This increasing trend in the population of sarus crane is an important aspect of ecological balance in the area studied. [8,10-13] strongly argued that this is happening because of awareness of local people and quite supportive nature of ecological and environmental conditions in and around the Alwara Lake. This conservation model can therefore be applied elsewhere for the conservation of other such species.

The authors recommend Ministry of Environment and Forests, Government of India and Uttar Pradesh for continuous population census of this species with frequent awareness programs and declaration of the entire Alwara Lake region as a "Sarus Sanctuary" for the conservation of sarus crane with regular monitoring. Measures should be taken to minimize the huge exploitation of natural resources of the Alwara Lake as well.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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