

POPULATION STATUS OF INDIAN SARUS CRANE (*GRUS ANTIGONE ANTIGONE*) IN GUJARAT STATE

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Introduction

Indian Sarus Crane (*Grus antigone antigone*) is the highest of all the flying creatures in the world. Unfortunately, the population level of this resident Crane of the Indian Subcontinent has reached the 'Endangered' category of the IUCN list of the threatened birds of the world (Anon., 1998).

Though the Crane has been recently recorded by Wildlife Institute of India, Dehra Dun in several States of the country (namely, Jammu & Kashmir, Haryana, Rajasthan, Gujarat, U.P., Bihar, Meghalaya, Assam, Madhya Pradesh and Maharashtra), its population is mainly concentrated in U.P., Gujarat and Rajasthan (Sunder *et al.*, 1999). The population sampling of the Crane has indicated that Gujarat supports the second-highest population of the Crane in the country, the highest being in Uttar Pradesh.

Owing to its 'endangered' status and high population in the State in addition to lack of information regarding its overall status during 1990s, GEER Foundation has conducted a survey-based study of the Sarus Crane in entire Gujarat State by engaging scientists, Forest Department officers, university researchers and nature-

lovers of the State. The present paper summarizes findings on population status of Sarus in Gujarat State, which are derived through this study conducted between September 1997 and January 2000.

Study Area

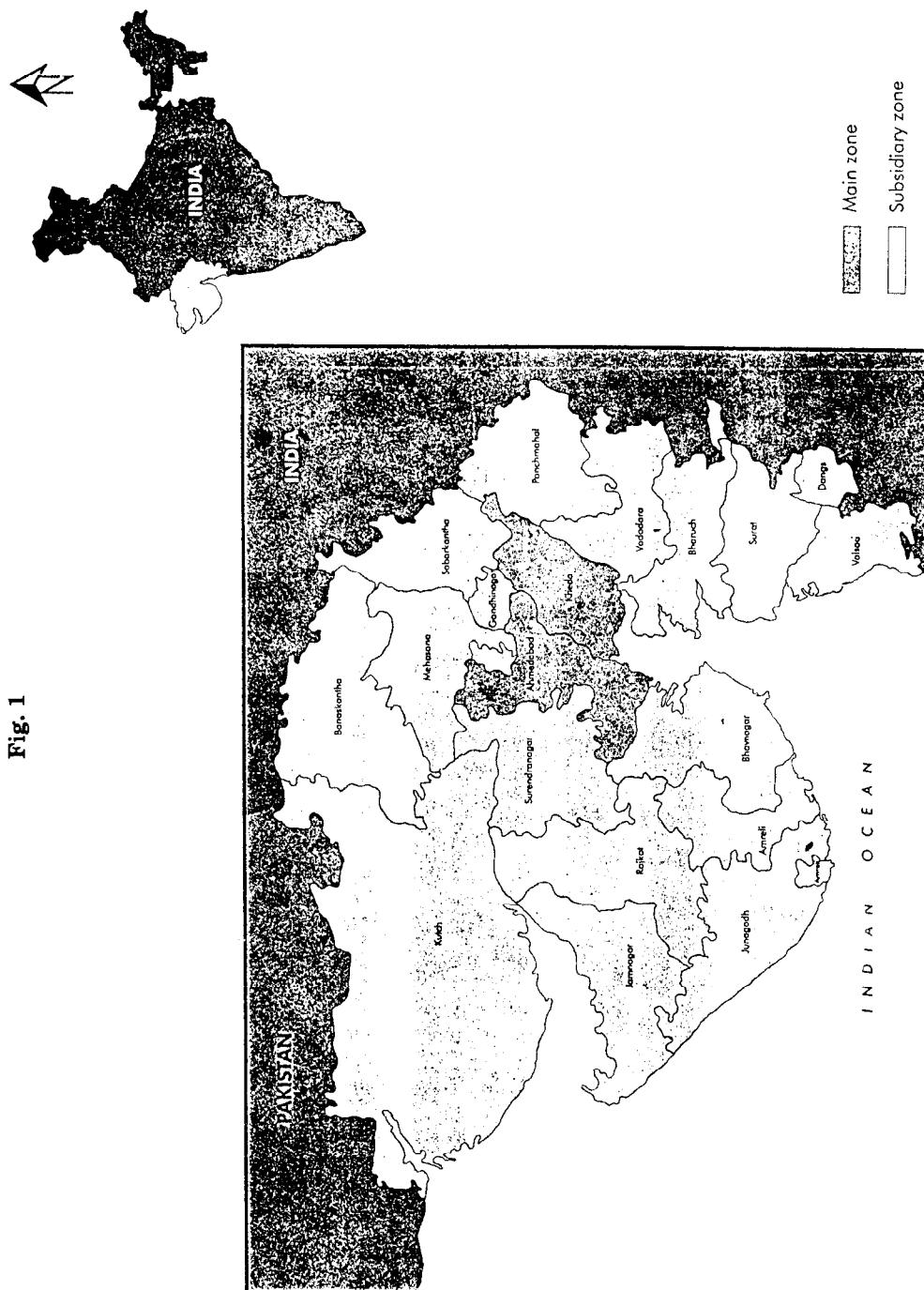
The study area covered entire Gujarat State. However, on the basis of the secondary information it was known that the portions of Central and North Gujarat covering Ahmedabad and Kheda Districts have been Sarus-rich areas. Consequently, this area was demarcated as the Main Zone (MZ) of the study area. The area of the State falling outside this zone has been designated as Subsidiary Zone (SZ), which included Kutch, Banaskantha, Sabarkantha, Mehsana, Gandhinagar, Surendrangar, Rajkot, Jamnagar, Bhavnagar, Amreli, Junagadh, Valsad, Bharuch, Surat and Dangs Districts (Fig. 1). It may be noted that recently (in 1997), the State has been re-arranged in 25 districts instead of 19 as per older arrangement. However, for the present study, older district-boundaries have been followed.

Methodology

The methodology has been developed

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Fig. 1



Main Zone and subsidiary zone of study area

to collect population data (along with other data on distribution, breeding, threats etc.) of the Sarus Crane from villages of all the districts of the State. This is because the Crane is mainly an element of ruderal (rural) ecosystems of the State, not restricted merely to wilderness areas. Population data was mainly collected between August 1998 and October 1998.

Main Zone (MZ) was intensively covered through field surveys by visiting majority of villages falling in it. Enumerators (about 20) along with their assistants visited a total of 1,545 villages of the Main Zone, of which 605 villages fall in 7 talukas of Ahmedabad District and 940 villages fall in 10 talukas of Kheda District. Keeping major highways (such as NH-8) as reference lines, the entire MZ was subdivided into several sub-zones, which were further assigned to different members of the survey team for conducting the survey. The investigators, along with their assistants traveled along the National highways, State highways and other tarred roads as also non-tarred tracks (like cart-tracks/pack tracks in agriculture areas). Apart from detecting and counting Sarus Crane through direct sightings by themselves in a variety of habitats (like cropland, fallow land, inundated paddy fields, marshes, ponds, irrigation reservoirs, lakes and rivers) the survey team-members also conversed with villagers at length. In large number of villages, the farmers, shepherds, 'Sarpanch' and other elders were contacted *in-situ* to know about the recent (1-15 days) sightings of the Crane by them in their respective villages and to get their impressions regarding the Sarus population in the past and present. A 'Sarus Survey Form' was prepared to help enumerators record details of direct sightings and those of information given by villagers.

As monsoon is known to be the nesting period of the Sarus Crane, the survey was deliberately conducted during this season. This strategy minimized the chances of double counting of the Crane due to the fact that movement of numerous Sarus-pairs gets restricted to their respective nesting territories and thus the possibility of long distance mobility of the Crane is minimized. This further minimized the chances of double counting. Moreover, status of nesting of the Sarus for the year 1998 with some weather vagaries could also be assessed due to selection of monsoon as survey period.

In order to estimate the population of the Sarus Crane in the Subsidiary Zone (SZ), the investigators relied on the feedback from villagers, naturalists and forest officers. Local naturalists, nature clubs and Dy. CFs were requested to cover their areas (especially wetlands known to support the Sarus) for counting. The feed-back was received through correspondence received from about 30 individuals in response to the press-release note of the Foundation published by local newspapers, requesting the need for the information on Sarus population from individuals in their respective localities. Feedback was received for about 70 sites/villages and the information was recorded in a separate register maintained at the Foundation after scrutiny. In the Main Zone (MZ), survey team members also observed and kept notes about feeding and breeding aspects of the Sarus. Notes were also kept regarding the information collected from local villagers and photographs were taken, whenever it was found necessary.

Results and Discussion

Hitherto, very limited numbers of census have been conducted in the State,

specifically to estimate the population of the Sarus Crane. They were conducted during 1980s by the State Forest Department and a few experts.

Though there had been an over-estimation of the Sarus population (19,659 cranes), in the opinion of several experts, the census conducted by State Forest Department in January, 1984 has a few desirable aspects as given below :

- This was the first census conducted in early 1980s. As it was conducted in early 1980s, it gives ample period for assessing population fluctuation with respect to results of other census conducted in late 1980s and 1990s.
- This was the only census, which covered all the districts of the State and the Cranes were counted through direct sightings instead of sampling.
- This was the first organized large-scale effort to count the Sarus population through direct sightings by involving large number of enumerators.

The survey conducted by the Foundation in 1998 is just a second attempt after the census of 1984 by Forest

Department, to count Sarus Cranes through direct sightings by visiting very large number of villages in MZ. About 940 villages belonging to 10 talukas were visited in Kheda District and over 600 villages belonging to 7 talukas were visited in Ahmedabad District to count the Sarus Crane through direct sighting on one hand and taking population estimates from the villagers on the other hand. Village-wise database has been created to know overall population of the Sarus Crane in Kheda and Ahmedabad Districts each. The Sarus Crane has been recorded in total 426 villages of MZ of which, 203 (48%) belong to Kheda District and 223 (52%) belong to Ahmedabad District. In all, 737 individuals were recorded in (179 villages of) Kheda District and 719 individuals were recorded in (208 villages of) Ahmedabad District, making a total of 1,456 Sarus Cranes in the MZ (Table 1). This makes a massive 84% of the State population. It can be said that of the total 1,456 Cranes recorded in the MZ, 50.6% were recorded in Kheda District and 49.4% were recorded in Ahmedabad District. In other words, the number of Sarus Cranes recorded in Kheda District are just 2.4% higher than the number of Cranes recorded in Ahmedabad District. This indicates that both districts have nearly equal population.

Table 1

Sarus population in the Main Zone (MZ) in monsoon 1998

Districts	Population of Sarus crane recorded		
	Directly sighted by survey team	Additional numbers informed by villagers/others	Total population estimate
Kheda	614	123	737
Ahmedabad	471	248	719
Total	1085	371	1456

Matar Taluka in Kheda District supports the highest population of the Sarus Crane (261), not only among other talukas of the district, but also among all the talukas in MZ. In other words, the highest population of the Sarus Crane in MZ has been recorded in Matar Taluka of Kheda District. Viramgam Taluka in Ahmedabad District has supported the second highest population (252 individuals) in the MZ. The potential reason for very high population of Sarus in Matar Taluka is easy to understand. As quoted elsewhere, Parasharya *et al.* (1989) have already mentioned that extensive area under paddy cultivation, in addition to large number of ponds and reservoirs with hydrophytic vegetation in this taluka is the main reason for very high population of Sarus Cranes. The reason for high population of Sarus in Thasara Taluka (153 cranes) of Kheda District as also in Sanand (178 Cranes), Daskroi (108 Cranes) and Dholka (148 Cranes) talukas of Ahmedabad appears to be the same. However, the possible reason for very high population in Viramgam Taluka in Ahmedabad District cannot be explained on the similar ground. Paddy cultivation is negligible here due to rain-fed agriculture in this region receiving scanty rainfall. Rather, crops like cotton, jowar and bajra were found predominant during the survey. High Sarus population in Viramgam can be justified on the basis that the Sarus is numerous and resident only in non-intensive agricultural areas that are not highly mechanised and indeed backward in economic development (Gole, 1996). Moreover, the number of villages in this taluka is the highest (163) among all the talukas falling in MZ and during field surveys, it was observed that almost in every village, there exists one (or more) 'Sim talavadi'. Note that 'Sim talavadi' is a local term for small shallow ponds with

hydrophytic vegetation, which is located in/near agricultural land. Such 'talavadis' usually located away from the human settlements provide feeding/breeding habitat for numerous pairs of Sarus. Moreover, these also exist marshes, village ponds and irrigation reservoirs in several villages, which were found to provide suitable habitat to the Sarus Crane. A part of Nal Sarovar lake falling in Viramgam Taluka also provides shelter to Sarus. In short, though Viramgam Taluka has negligible area under paddy cultivation (e.g. in villages like Thori, Liya etc. on Hansalpur-Surendranagar road), it has numerous 'Sim talavadis' and other lentic waterbodies in its large number of villages, which support very high population of the Sarus Crane.

Population in the Subsidiary Zone (SZ)

The district-wise population of the Sarus Crane along with the names of talukas in which they were recorded is given in Table 2.

It can be seen from Table 2 that total 274 individuals of the Sarus Crane are recorded, which constitute only 18.8 per cent of its total population recorded in the MZ.

It is revealed that in SZ, the Sarus Crane is concentrated more in Valsad (including Navsari), Surendranagar and Mehsana Districts compared to the other districts viz. Amreli, Banaskantha (including Radhanpur), Bhavnagar, Bharuch, Dangs, Gandhinagar, Jamnagar, Junagadh, Kutch, Panchmahal, Rajkot, Sabarkantha, Surat, Surendranagar and Vadodara. In fact, Sarus Cranes were not recorded in Dangs, Gandhinagar and Rajkot Districts during the survey during the

Table 2

Sarus population in Subsidiary Zone (SZ) in monsoon 1998

Districts (Talukas)	Sarus population
Amreli (Liliya)	6
Banaskantha (Radhanpaur, Santalpur, Vadgam)	10
Bharuch (Jambusar)	2
Bhavnagar (Bhavnagar, Valbhipur, Ghogha, Palitana, Talaja)	23
Dangs	-
Gandhinagar	-
Jamnagar (Jamnagar, Jodiya)	8
Junagadh (Porbandar, Keshod)	16
Kachchh (Rapar)	10
Mehsana	25
Panchmahal (Lunavada, Jhalod, Santrampur)	16
Rajkot	-
Sabarkantha (Himmatnagar, Idar, Prantij)	8
Surat	3
Surendranagar (Dhangadhra, Halvad, Patdi, Limbdi, Than)	44
Vadodara (Salvi)	3
Valsad	100
Total estimated population in districts other than Ahmedabad and Kheda	274

Note : - indicates species not recorded during the survey.

monsoon 1998. However, a small flock consisted of 9 individuals of the Sarus Crane was reported occurring between Lawarapur and Shahpur villages near Gandhinagar. They were seen on 4th May 1999 by an RFO, GEER Foundation. The flock was sighted in agriculture land. Similarly, 12 Sarus cranes were sighted at Veri Talav of Gondal town (Gondal Taluka) in Rajkot

District on 4th February, 1999 (Dy. C.F. - Rajkot, *pers. comm.*). In South Gujarat, Valsad (including Navsari) has an estimated population of about 100 individuals. The population estimated for Valsad is higher than number of the Sarus Crane recorded in Surat, Bharuch and the Dangs. However, it must be noted that population estimate for Valsad (including Navsari) District is one provided by the Dy. CF, Valsad which is based on his judgement. The judgement appears to be on the higher side and probably the actual population would be much below the estimate reported. He has reported that the Sarus Crane in Valsad District is concentrated in Palan Khajurdi, Phadwel, Tistari, Chharwada, Chikhili, Bhadel, Jagdala and Joravasan localities as also in the areas in the vicinity of Purna river course. In Saurashtra, Surendranagar supports the highest number (44) of the Sarus Crane followed by Bhavnagar District (23) and Junagadh District (16). Both Jamnagar (Saurashtra) and Kachchh (Kutch) Districts support low population of around 10 individuals each. In Central Gujarat, Vadodara and Bharuch Districts, the neighbouring districts of Sarus-rich Kheda (in MZ) supports negligible number of the Sarus indicating that extensive paddy cultivation fed by Mahi canal network in Kheda District has been effective enough to prevent the Sarus Cranes dispersing to other districts of Central Gujarat. It may not be improper to mention here that Vadodara District had supported good Sarus population in the past [as mentioned in earlier sections, a British officer James Forbes had seen large flocks of the Sarus between 1780-1783 (Kothari *et al.* 1996)]. Another British naturalist, Littledale had also seen flocks consisted of 50-200 individuals of the Sarus. The potential shifting of the Sarus populations from Vadodara to Kheda

District indicates the impact of large-scale human activity such as Mahi canal irrigation projects. In North Gujarat, Mehsana supports the highest number (25) of the Sarus, though this is quite less compared to the population in Surendranagar District adjoining its southern boundary. Note that Surendranagar District supports the highest population in Saurashtra region. Both Sabarkantha and Banaskantha Districts in North Gujarat support a rather low population of 10 individuals each.

Population in the entire State (MZ and SZ)

Based on the findings on population of the Sarus Crane in the Main Zone (MZ) and Subsidiary Zone (SZ), it is revealed from Tables 1 and 2, that total Sarus population in the entire State is 1,730 individuals. Of

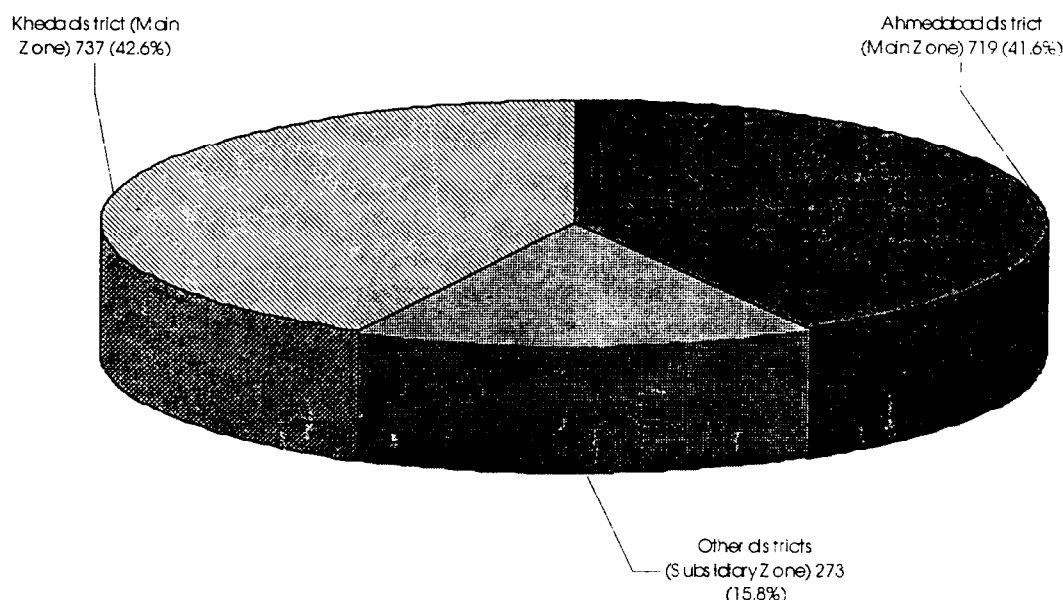
these, 84.2% of all the individuals of the Sarus Crane occur only in MZ (viz. Ahmedabad and Kheda Districts), whereas only 15.8% individuals of the Sarus Crane occur in SZ. In SZ too, majority of the proportion of the Sarus population occurs in Valsad (including Navsari), Surendranagar, Mehsana and Bhavnagar Districts with estimated population of 100, 44, 25 and 23 individuals respectively (Figures 2, 3).

There is every reason to believe that the population of the Sarus Crane in the State is about 1,700 individuals.

Population decline in the State

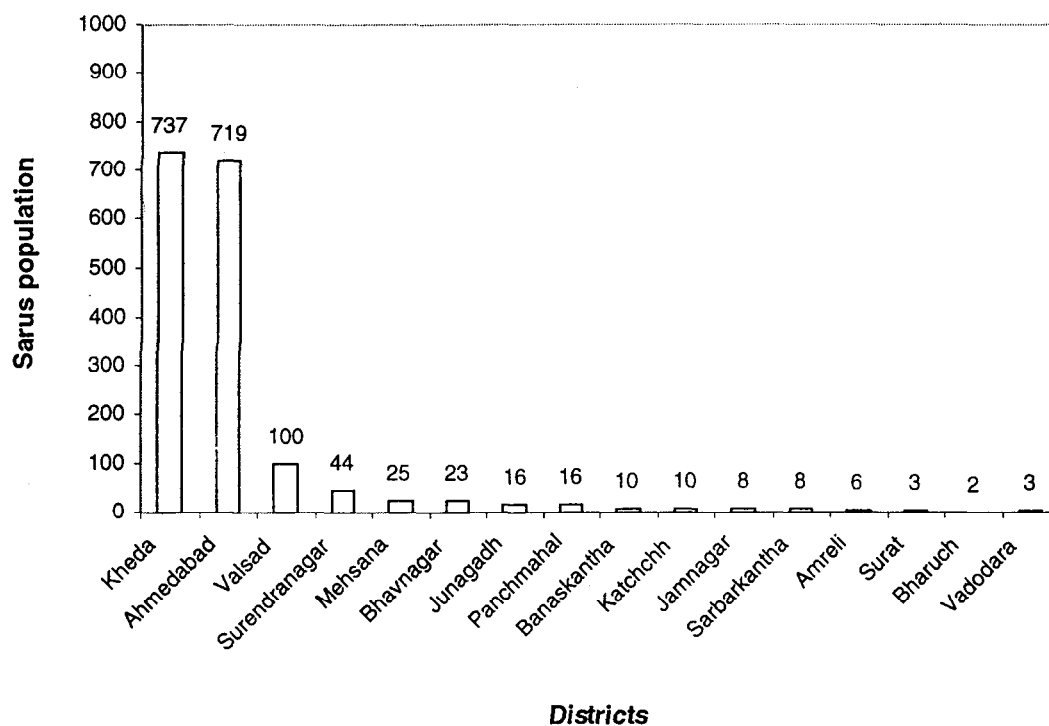
As stated earlier, the State Forest Department had put the estimate of 19,659

Fig. 2



Number and proportion (%) of Sarus Crane in Kheda, Ahmedabad and other districts of Gujarat

Fig. 3



District-wise population of Sarus Crane in Gujarat State recorded in 1998

Sarus cranes in the entire State through a State-level survey conducted in early 1980s. The population estimated for the State through the present study (1,700 individuals) indicates that within time-span of about 15 years, the Sarus population has dwindled by massive 91%. There is possibility of over-estimation of the

population in 1984 according to opinion of several experts, but it is beyond doubt that the State supported good number of the Sarus in 1984. Therefore, Sarus population estimated in 1998 is just a fraction of the population estimated in 1984. Considering the time span of 15 years, the rate of population decline is very high.

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SUMMARY

The study conducted between 1997 and 2000 by GEER Foundation has shown that Sarus population in Gujarat State is around 1,700 individuals. Majority (about 84%) of the Sarus population (1,456) in the State is concentrated in Kheda and Ahmedabad Districts in Central

and North Gujarat respectively. Kheda has the highest population (737 Cranes) in the State, whereas Ahmedabad District has the second-highest population (719 Cranes). Matar Taluka in Kheda District and Viramgam Taluka in Ahmedabad District support the highest population among all the talukas in the respective districts. Surendranagar, Valsad and Mehsana Districts also support moderately good population of the Crane. With respect to the population of the Crane in the State in the year 1984, the present Sarus population is fractional.

भारतीय सारसों (युस एटिगोने एटिगोने) की गुजरात में संख्या स्थिति

केतन टाटू

सारांश

1997 और 2000 के दरम्यान गीर प्रतिष्ठान द्वारा किए गए अध्ययन ने दिखाया है कि गुजरात राज्य में सारसों की संख्या 1700 के लगभग है। सारसों की अधिकांश (लगभग 84%) संख्या (1456) मध्य और उत्तर गुजरात के क्रमशः खेड़ा और अहमदाबाद जिलों में ही संकेन्द्रित है। इस राज्य में इनकी संख्या सबसे अधिक (737) खेड़ा जिले में है जिसके बाद दूसरे क्रम पर सर्वाधिकता में जहां इसकी संख्या अधिक (719 सारस) मिलती है। खेड़ा जिले के मातार ताल्लुके और अहमदाबाद जिले के वीरम गांव ताल्लुके अन्य ताल्लुकों के मुकाबले में इनकी अधिक संख्या मिलती है। सुरेन्द्रनगर बलसाढ़ और मेहसाना जिलों में भी सारसों की मध्यम अच्छी संख्या मिलती है। जहां तक वर्ष 1984 में राज्य में सारसों की संख्या की बात है, यह संख्या उसका एक अंश ही बताती है।

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