INTERNATIONAL JOURNAL OF PLANT, ANIMAL AND ENVIRONMENTAL SCIENCES
IJPAES
Volume-5, Issue-3, July-Sept-2015 Coden:IJPAJX-CAS-USA, Copyrights@2015 ISSN-2231-4490
Received: 24th April-2015 ***Revised: 16th May -2015*** ***Accepted: 16th May-2015***
Research article

POPULATION COMPOSITION AND DISTRIBUTION OF INDIAN SARUS CRANE *GRUS ANTIGONE ANTIGONE* IN GAUTAM BUDH NAGAR DISTRICT, WITH SPECIAL REFERENCE TO SURAJPUR WETLAND, NATIONAL CAPITAL REGION, INDIA

Nasim Ahmad Ansari

Wildlife Institute of India, P.O. Box #, 18 Chandrabani, Dehradun, Uttarakhand, India
Email: nasim@wii.gov.in Tel. 135 2646 340 (O) +91 8449908531 (M)

ABSTRACT: Indian Sarus Crane *Grus antigone antigone* is the world's tallest flying bird and the State bird of Uttar Pradesh. The study was conducted in 15 small wetlands and paddy fields in the district Gautam Budh Nagar with special reference to Surajpur wetland. The district located in western Uttar Pradesh, which holds the highest number of Sarus Cranes in India. The study was conducted on monthly basis intensively for the period of 3 years from March 2010 to February 2013 in Surajpur wetland and occasional visits on fifteen sites of the district Gautam Budh Nagar following direct total count method. In Gautam Budh Nagar district, 6 individuals of in 2010, 4 in 2012, 14 in 2013 and 22 in 2014. In Surajpur wetland, yearly, a total of 65 Sarus Cranes in 2010-11, 31 in 2011-12 and 37 in 2012-13 were recorded; seasonally, summer recorded maximum number of Sarus Cranes (n=67) and monsoon recorded minimum number of Sarus Cranes (n=30). Month-wise, May recorded highest number and September recorded least number of Sarus Cranes in Surajpur wetland. The most common threat appeared to be the result of degradation of wetlands and use of pesticides in agricultural development. The data collected could be useful in further planning of research and conservation efforts in the district and elsewhere.
Key words: Sarus Crane, Conservation, Gautam Budh Nagar, Uttar Pradesh, India

INTRODUCTION

The Indian Sarus Crane (ISC) *Grus antigone antigone* is one of the fifteen known species of cranes in the world and is the only resident breeding crane found in India and south-east Asia. It is the tallest flying bird of the world with 1.5 to 1.8 m height [1, 15, 23]. ISC is a worthy flagship species for the reason that it is a charismatic, endemic and symbolic bird species inhabiting large wetland area scattered in agriculture landscapes of Uttar Pradesh [14] 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 [30]. It is the state bird of Uttar Pradesh, where it survives in the largest number [19, 27, 28]. Mainpuri and Etawah districts of Uttar Pradesh are home to the largest population (about 70% and one third world's population) of ISC, probably due to the large wetland complexes (a total of 113 wetlands) and agriculture landscapes which supports the breeding ground [2]. Sarus Cranes are most common and densely distributed in the Indian states of Uttar Pradesh, Rajasthan, Gujarat, and Haryana; they are less common in Bihar and Madhya Pradesh [10]. In India percentage of breeding Sarus Cranes is maximum in Gujarat state though the maximum number of Sarus Cranes breeding is in Uttar Pradesh [7].

The population trend of ISC is decreasing and is listed as 'Vulnerable' threatened category of IUCN Red List. The population has declined sharply over the last several decades. A total of 11905 individuals recorded during Sarus Crane census 2010 conducted by Department of Forest, Government of Uttar Pradesh, however an estimated data upto 2009 was of 20,000 approx total number in India. Poisoning of Sarus Cranes due to extensive use of pesticides in India is a menace in these days and unprecedented before. At the time when the populations of Sarus Crane rapidly declining over the world, 14 of these were found allegedly poisoned in Dadri Tehsil of Gautam Budh Nagar in Uttar Pradesh on 13 January 2013 (Source: Times of India, 15 January, New Delhi). In recent times, farmers in Uttar Pradesh consider the Cranes as a pest during the harvest season of both paddy and wheat [2].
A review of literature suggests that there had been only a few attempts to study the demography and ecology of ISC on large scale in Uttar Pradesh [12, 26, 27, 28, 19, 14, 13, 8, 9]. Unfortunately, intensive data collection and reporting in not available for the Gautam Budh Nagar district including Surajpur wetland. The aim of this paper is to review the ISC in the district Gautam Budh Nagar by combining my own observations with other published and unpublished records, and to discuss the conservation issues of this area. The present study was intended to collect the primary information on population status, distribution, demography, threats and conservation strategies of ISC in Gautam Budh Nagar district along with detailed study in Surajpur wetland.

MATERIALS AND METHODS

Study Area

Gautam Budh Nagar (28°3'N 77°2' E) covers an area of 1354 km^2, is a district of Uttar Pradesh state in the Northern India (Fig. 1). The district falls in Upper Gangetic Plain Biogeographic Zone [22]. The River Yamuna separates the district from Haryana state and Delhi to the west and Hindon River also passes from the district. The district is bounded by Ghaziabad district to the north, Bulandshahar district to the east, and Aligarh district to the south. There are three administrative Tehsils Dadri, Jevar and Sadar. The forest areas of the district are divided into two Dadri and Sikandrabad forest Ranges. Being in the purview of National Capital Region, the development of the district is moving with a fast pace and are the world class industrial hubs. The district is important not just at state level but also at national level, 25% of the total revenue of Uttar Pradesh has been received from this district [3].

Gautam Budh Nagar Forest Division listed 20 small wetlands in the district, Out of the 20 listed wetlands; only 13 wetlands and two other Sarus sites could be surveyed with their physical details (Table 1). These wetlands fall in the Dadri range of Gautam Budh Nagar Forest Division. Fifteen sites, Surajpur Lake, Shahpur Khurd, Pyawali, Chaisa, Jarcha, Cholas, Khadeda, Khatana, Beel Akbarpur, Kali Mandir, Kemrala, Nagla Agriculture land, Saintli, Kalonda, Agriculture land between Chaysa and Kalonda were searched for ISC in the district. Detailed study on Surajpur wetland was performed. Surajpur wetland (28°31.425'N; 77°29.714'E) is situated in Dadri Tehsil of District Gautam Budh Nagar, Uttar Pradesh. The wetland falls in the Gangetic Plain Biogeographic Zone [22] at an elevation of 184.7m above MSL. The area is a reserve forest and spreads over 308 hectare that includes 60 hectare of natural wetland (Fig. 2). The terrain of the area is almost plain, although the expanse divides the area into flat terrestrial form and deep wetland area. The area has fine grained soil called lacustrine soil and natural vegetation is of tropical dry deciduous type [6]. Surajpur wetland is mainly rain-fed. Other sources for water recharge are catchment area of Hawaliya drain which is attached to Hindon River and the irrigation canal of Tilapta Minor, which originates from Kulesra Bund Hindon River. The general climate is tropical monsoon type and South-west monsoon are the main source of rainfall. Maximum rainfall occurs from July to October ranging from 400-500mm. During monsoon the catchment area is full of water and the inundated area extends up to 108 hectares. However, during summer the major portion of the wetland remains dry and the inundated area recedes to 30-40 hectare [5].

Methods

The study was conducted on monthly basis intensively for the period of 3 years from March 2010 to February 2013 in Surajpur wetland and occasional visits on fifteen sites (Table 1) of the district Gautam Budh Nagar. Direct total counts were done from widely spread out fixed vantage points. Since the Sarus Crane is a huge bird and visible from a distance, we presume our counts are accurate [17]. Direct observations were made in these fifteen sites to assess the population size and different activities. Historically known potential sites for Sarus habitation were selected for head counting. Thus the canals, the rivers, the ponds, the lakes, the agriculture field and barren land with water stagnation were the target sites for counting in the listed sites of the district [13]. Among 15 sites, 13 were small wetland sites and two were agriculture lands near the villages. Surveys were conducted on monthly basis in the morning between 0600–0900 hr and evening 1400–1700 hr during our routine field trips [19] and 10'X' binoculars were used for sightings [29]. Questionnaire surveys were also made in these villages and the questions focused on ISC sightings and breeding status. Additional information regarding family size, supplementary occupation, agricultural outputs from the wetlands, and local attitudes towards the Sarus was also collected.

RESULTS AND DISCUSSION

A total of 15 sites (13 wetland sites and two sites in agriculture lands) were explored for the presence of ISC in the district Gautam Budh Nagar (Table 1). During the study period, 17 individuals of ISC were recorded in the district. One pair of ISC was recorded from Khatana wetland, 3 individuals of ISC in Shahpur wetland, and two pairs of ISC in Beel Akbarpur wetland. One pair each of ISC was recorded in agricultural field between Chaysa and Cholas villages and Chaysa and Kalonda villages of Dadri Tehsil, Gautam Budh Nagar. Shahpur wetland also recorded one breeding pair with one chick in 2012. Beel Akbarpur wetland recorded one breeding pair with two chicks in 2010. One breeding pair in Surajpur wetland was observed in 2011 and raised a chick.

Surajpur wetland recorded regular presence of ISC from March 2010 to February 2013 with the maximum sighting of 28 individuals. During the span of 3 years a total of 133 individuals were recorded with mean monthly sightings of 4 individuals. During the study period, the overall monthly sighting fluctuates as May recorded the maximum number of individuals (n=32) and September recorded least number of individuals (n=5) of ISC (Figure 3). Season-wise, summer recorded maximum number of individuals (n=67) and monsoon recorded minimum number of individuals (n=30) of ISC; year-wise first year 2010-11 recorded maximum number of individuals (n=65) and second year 2011-12 recorded minimum number of individuals (n=31) of ISC.

Western Uttar Pradesh was identified as an important area in context to distribution of Sarus Crane where largest breeding populations were recorded during various studies [12, 26, 27, 28, 19, 14, 13, 8, 9]. Jha (2010) [26] conducted the census in 69 districts of Uttar Pradesh during 2010 and counted 6 individuals of Sarus Cranes found in Gautam Budh Nagar district. Sarus Protection Society Lucknow, Uttar Pradesh was also conducted Sarus census in 81 districts of Uttar Pradesh on yearly basis and counted 6 individuals of Sarus Cranes in July 2010, 4 in June 2012, 8 in June 2013, 20 in December 2013 and 22 Sarus Cranes in 2014 in Gautam Budh Nagar district [11].

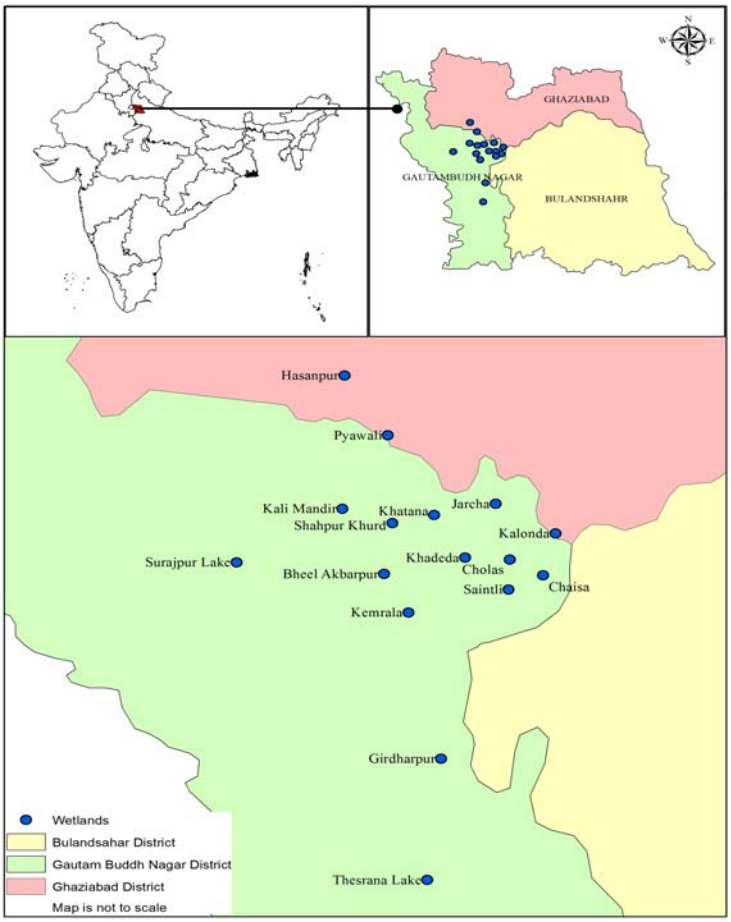

Figure 1. Map of Gautam Budh Nagar showing satellite wetlands

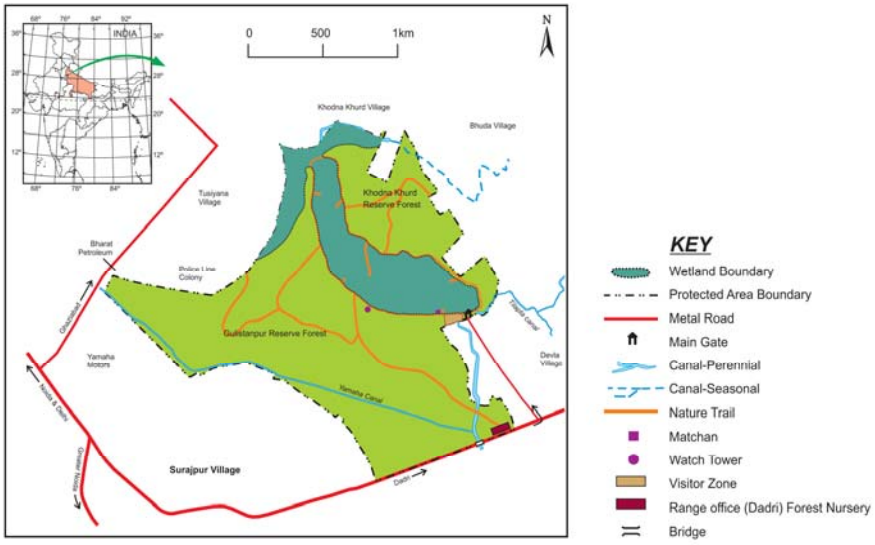

Figure 2. Map of Surajpur wetland

Table 1. Details of wetland surveyed during ISC Census, Gautam Budh Nagar Uttar Pradesh

S. No.	Name of the wetland	Co-ordinates	Area (ha)	Type	Conservation status of wetland/waterbody
1	Surajpur Lake	28° 31' 43.2" N & 77° 29' 63.8" E	108	Perennial	Reserve Forest Area
2	Shahpur Khurd	28° 33'18.2" N & 77° 34'87.6" E	8	Seasonal	Private land
3	Pyawali	28° 36' 40.1" N & 77° 35' 12.4" E	5	Perennial	Gram Samaj
4	Chaisa	28° 31' 32.6" N & 77° 40' 50.0" E	4.5	Perennial	Gram Samaj
5	Jarcha	28° 34' 06.0" N & 77° 39' 04.4" E	3	Seasonal	Gram Samaj
6	Cholas	28° 31' 65.2" N & 77° 38' 98.2" E	2	Seasonal	Gram Samaj
7	Khadeda	28° 32' 06.5" N & 77° 37' 63.9" E	2	Perennial	Gram Samaj
8	Khatana	28° 33' 38.1" N & 77° 36' 55.1" E	2	Seasonal	Gram Samaj
9	Beel Akbarpur	28° 30'86.2" N & 77° 35'14.7" E	2	Perennial	Private land
10	Kali Mandir	28° 33' 46.5" N & 77° 33' 41.6" E	1.5	Seasonal	Gram Samaj
11	Kemrala	28° 29' 63.6" N & 77° 35' 68.6" E	1.5	Seasonal	Gram Samaj
12	Nagla agriculture land*	28° 31'96.7" N & 77° 39'91.4" E	1.5	Seasonal	Private land
13	Saintli	28° 30' 59.3" N & 77° 38' 97.7" E	1.5	Perennial	Gram Samaj
14	Kalonda	28° 32' 64.8" N & 77° 40' 72.7" E	1	Perennial	Gram Samaj
15	Agriculture land between Chaysa and Kalonda*	28° 30'44.3' N & 77° 37'73.8" E	0	Seasonal	Private land

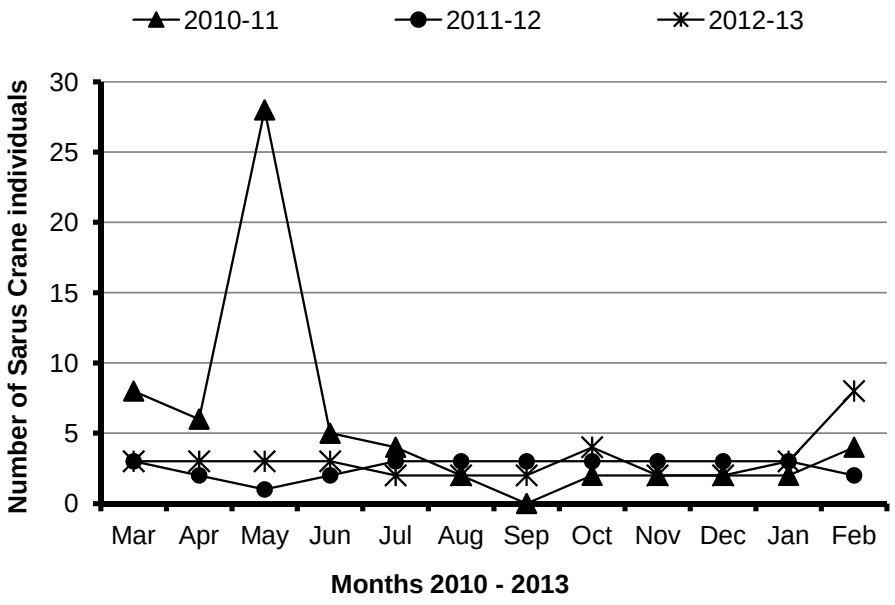

Figure 3. Monthly fluctuations in ISC individuals in Surajpur wetland.

Surajpur wetland is one of the ecologically important areas within the urban sprawl [20]. The highest population of Sarus Crane was reported in summer during the survey due to availability of sufficient food, mainly small molluscs, crustaceans and worms present in the wetland. In summer, most wetlands dry up, leading to congregations of Sarus crane in the few available perennial wetlands [17] and Surajpur wetland is one of them having water even in summer seasons. Two to three pairs of Sarus Crane are found and they also breed in the area [20]. Their optimal habitat includes a combination of small seasonal marshes, floodplains, high altitude wetlands, human-altered ponds, fallow and cultivated lands, and rice paddy. Usually, they focus their foraging on underground tubers of native wetland vegetation such as *Eleocharis* sp. [17].

Present study tends that, Sarus crane preferred wetlands in comparison to crop fields. Many studies reported that Sarus crane prefers paddy fields [25, 24] agriculture fields [21] but, in the present study it was found preferring the natural wetlands [30, 12]. Habitat destruction, urbanisation and increasing industrial activities were identified as major problems faced by these species in some parts of the district. Many wetlands are facing high pressure of intrusion, e.g., crop field near Shahpur wetland, Dadri Tehsil, Gautam Budh Nagar is almost influenced by excessive use of chemicals and pesticides in agricultural activities leading to mortality of 14 Sarus Cranes and other birds in 13 January 2013 (Source: Times of India, 15 January: New Delhi). The common threats identified for Sarus conservation are wetland depletion and conversion, extensive use of pesticides, reduced augmentation, collision/ electrocution deaths and hunting and pet trade.

Results of the questionnaire survey in this study indicated that 90% of respondents believe that Sarus conservation could be improved by government compensation for crop damage by the cranes. Borad *et al.,* (2002) [4] and Mukherjee *et al.,* (2002) [16] drew similar conclusions that financial assistance to the farmers for conservation in lieu of paying for crop damage during nesting would reduce egg-chick damage, and, in turn, would improve breeding performances of the cranes. During informal interviews in this study, it was suggested that such payments for conservation was a short term gain as the monetary assistance by the state could not be perpetual. Likewise, it was believed that such payments would result develop a dependency attitude in the populace. Parasharya *et al.,* (1996) [18] advocated that education of farmers through religious teaching may bring dividends in the effort of co-existence of Sarus with human habitation and surrounding agricultural systems.

CONCLUSIONS

Wetlands are more valuable economic resources when retained in their natural or semi-natural state since they support a wide variety of flora and fauna. Surajpur Lake is an old marshy natural wetland situated in the tropical part of India. From the ecological point of view the site is very favourable for ISC distribution. Strategies need to be adopted in this area to effectively save the threatened Sarus Crane which is the pride of Uttar Pradesh. For long term conservation of the Sarus Crane and its habitat in Surajpur wetland, immediate protection measures need to be adopted. Community involvement needs to be encouraged to take part in the conservation programme by adjoining villages.

ACKNOWLEDGEMENTS

I extend my earnest thanks to the Uttar Pradesh Forest Department for provide support and necessary facilities to conduct this survey in the district Gautam Budh Nagar. We are grateful to World Wide Fund for Nature- India to render all necessary assistance to conduct the detailed study in Surajpur wetland. I express my gratitude to Dr. Asghar Nawab and Mohd. Shahnawaz Khan from WWF India, for helping in the field work and data collection.

REFERENCES

[1] Ali, S., and Ripley, S.D. 1980. Handbook of the birds of India and Pakistan. Megapodes to Crab Plovers. Vol.II. Oxford University Press, Delhi.

[2] Ansari N.A. 2013. Sarus Cranes in Jeopardy. Science Reporter 50(5), 16-17.

[3] Ansari N.A. 2015. Dynamic cropping pattern within the last two decades: A case study of Gautam Buddh Nagar District, National Capital Region, India. International Journal of Advanced Research 3(4), 262-265.

[4] Borad, C.K., Mukherjee A., Patel S.B. and Parasharya B.M. 2002. Breeding performance of Indian Sarus Crane *Grus antigone antigone* in the paddy crop agro-ecosystem. Biodiversity and Conservation 11, 797-805.

[5] Bura, P., Ansari N.A. and Nawab A. 2013. Ecological Assessment, Conservation and Management of Surajpur Wetland, Greater Noida, Uttar Pradesh. In: Water and Biodiversity, Uttar Pradesh State Biodiversity Board, Lucknow, p. 95-103.

[6] Champion, H.G. and Seth S.K. 1968. The revised survey of the Forest Types of India. Manager of Publications, Government of India, New Delhi, p. 404.

[7] Chaudhary, B.C., Kaur J. and Sundar K.S.G. 1999. Sarus crane count–1999. Wildlife Institute of India, Dehradun, India.

[8] Chauhan, R. and Kumar D. 2000. A survey of Sarus cranes *Grus antigone* in Etawah and Mainpuri districts, Uttar Pradesh, India. Technical Report, Society for Conservation of Nature Etawah (UP), India.
[9] Chauhan, R., Bose J., Agarwal N., Dutt B., Mookerjee A. 2004. Crane Capital. Conservation strategy for Sarus crane *Grus antigone* habitats in Etawah and Mainpuri districts, Uttar Pradesh.
[10] Gole, P. 1989. The Status and Ecological Requirements of Sarus Crane. Phase I. Ecological Society, Pune, India, p. 45.
[11] http://www.sarusprotectionsociety.org 2015. Sarus Crane Census 2010. Retrieved from http://www.sarusprotectionsociety.org/Pages/sarus_count.html.
[12] Jha, K.K. and McKinley C.R. 2014. Demography and Ecology of Indian Sarus Crane *Grus antigone antigone* in Uttar Pradesh, Northern India. Asian Journal of Conservation Biology 3(1), 8–18.
[13] Jha K.K. 2010. Sarus Crane: State Bird of Uttar Pradesh. Uttar Pradesh State Biodiversity Board, e-Newsletter, BIODIV News 1(5), 2-6.
[14] Jha K.K. 2013. Save UP Wetlands to Save Flagship Species Sarus and in turn Wetland Biodiversity under the Umbrella. In: Water and Biodiversity, Uttar Pradesh State Biodiversity Board, Lucknow, p. 17-29.
[15] Meine, C.D. and Archibald G.W. (eds.) 1996. The Crane: Status, Survey and Conservation Action Plan. IUCN, Gland, Switzerland and Cambridge, UK, p. xi+282.
[16] Mukherjee, A., Borad C.K. and Parasharya B.N. 2002. Breeding performance of Indian Sarus Crane in the agricultural landscape of western India. Biological Conservation 105, 263-269.
[17] Nandi P.K. 2006. Protection of habitat of Sarus crane *Grus antigone* in Bhoj wetland, India. In: Boere GC, Galbraith CA, Stroud DA. Eds. Water-birds around the world: a global overview of conservation. The Stationery Office, Edinburgh, UK, p. 309-310.
[18] Parasharya B.M., Mathew K.L. and Sukhadia A.G. 1996. Relevance of agricultural ecosystem to birds and their conservation. Pan Asian Ornithological Congress and XII BirdLife Asia Conference, Coimbatore, India.
[19] Prakash, S, Narain S. and Kumar S. 2014. Conservation of the threatened Sarus Crane *Grus antigone* (Linnaeus, 1758) around Alwara Lake in Kaushambi District, Uttar Pradesh, India. Journal of Threatened Taxa 6(5), 5726–5730.
[20] Rahmani, A.R, Kumar S, Deori P, Khan J.A, Kalra M, Belal M.S, Khan A.M, Khan N.J, George A, Srinivas N, Singh V.P, Rehman F. and Muraleedhran S. 2010. Migratory movements of waterbirds through Uttar Pradesh and the surveillance of avian diseases. Bombay Natural History Society, Mumbai, p. 405.
[21] Ramachandran, K. and Vijayan V.S. 1994. Distribution and general ecology of the Sarus Crane *Grus antigone* in Keoladeo National Park, Bharatpur, Rajasthan. Journal of Bombay Natural History Society 91, 211-223.
[22] Rodgers, W.A, Panwar H.S. and Mathur V.B. 2002. Wildlife Protected Area Network in India: A review (executive summary). Wildlife Institute of India, Dehradun, p. 44.
[23] Singh, H.S. and Tatu K. 2000. A study on Indian Sarus Crane Grus antigone antigone in Gujarat state. Gujarat Ecological Education and Research (GEER) Foundation, Gandhinagar, India.
[24] Sundar, K.S.G. and Choudhary B.C. 2003. Nest sanitation in Sarus Cranes *Grus antigone* in Uttar Pradesh, India. Forktail 19, 144–145.
[25] Sundar, K.S.G. 2000. Distribution, demography and conservation status of the Indian Sarus Crane *Grus antigone* in India. Journal of the Bombay Natural History Society 97(3), 319–339.
[26] Sundar, K.S.G. 2010. Sarus cranes in Uttar Pradesh. Kat's Eye 2, 2-4.
[27] Sundar, K.S.G, Chaudhary B.C. and Kaur J. 2000a. Sarus crane count –2000. Wildlife Institute of India, Dehradun, India.
[28] Sundar K.S.G., Chaudhary B.C. and Kaur J. 2000b. Distribution, demography and conservation status of the Indian Sarus Crane *Grus antigone antigone* in India. Journal Bombay Natural History Society 97, 319-339.
[29] Umapathy, G., Hussain S. and hivaji S. 2009. Status and distribution of vultures in Andhra Pradesh, India. Forktail 25, 163-165.
[30] Yaseen, M., Saxena R. and Dubey S. 2013. Population Composition, Distribution and Habitat Preference of Indian Sarus Crane *Grus antigone antigone* in Chittaurgarh District, Southern Rajasthan. Journal of Chemical, Biological and Physical Sciences 3(4), 2784-2792.

INTERNATIONAL JOURNAL OF
PLANT, ANIMAL AND ENVIRONMENTAL SCIENCES

ISSN 2231-4490

International Journal of
Plant, Animal and Environmental Sciences