

SACON Report No. PR-230

**Conservation of Great Indian Bustard (*Ardeotis nigriceps*) in Karnataka:
Evaluating the population and ecological requirement of GIB in selected
locations in Karnataka with special emphasis to Bellary Landscape**

Technical Report

May 2020 – May 2022



Salim Ali Centre for Ornithology and Natural History

(Ministry of Environment, Forest and Climate Change, Govt. of India)

Anaikatty (Post), Coimbatore-641108, Tamil Nadu

**Conservation of Great Indian Bustard (*Ardeotis nigriceps*) in Karnataka:
Evaluating the population and ecological requirement of GIB in selected
locations in Karnataka with special emphasis to Bellary Landscape**

Technical Report: May 2020 – May 2022

Submitted to the
Forest Department, Karnataka

Investigators

H.N. Kumara

S. Babu

Junior Research Biologist

Deepak. D



Salim Ali Centre for Ornithology and Natural History

(Ministry of Environment, Forest and Climate Change, Govt. of India)

Anaikatty (Post), Coimbatore-641108, Tamil Nadu

Citation:

Kumara, H.N., Babu, S. and Deepak, D. (2022). Conservation of Great Indian Bustard (*Ardeotis nigriceps*) in Karnataka: Evaluating the population and ecological requirement of GIB in selected locations in Karnataka with special emphasis to Bellary Landscape. Technical Report (SACON Report No. 230). Submitted to the Karnataka Forest Department.

Table of contents

Chapter	Title	Page No.
	Acknowledgments	i
	Executive Summary	iii
01	Background, study area, and objective	01
	Background	01
	Study area	10
	Objective	14
02	Population status, distribution, habitat use, and activity pattern of Great Indian Bustard in Siruguppa	15
	Methodology	15
	Results	17
	Discussion	28
03	Vegetation of the forest land in the Great Indian Bustard area of Siruguppa	29
	Methodology	30
	Results	31
	Discussion	36
04	Insect density of the forest land in the Great Indian Bustard area of Siruguppa	39
	Methodology	39
	Results	41
	Discussion	44
05	Threat assessment in the Great Indian Bustard area of Siruguppa	45

	Observations	45
	Discussion	52
06	Conclusion and suggestions	55
	References	57
	Appendices	67

List of Figures

Figures	Page No.
Figure 1.1. Historical range and recorded sightings of Great Indian Bustards in the past in Karnataka	08
Figure 1.2. a. Location of Bellary district in Karnataka, b. Siruguppa taluk in Bellary district and c. The black soil area in Siruguppa taluk	09
Figure 1.3. Land Use-Land Cover map of Siruguppa taluk (2015-16)	09
Figure 2.1. One square kilometer grid cells overlaid on the study area in Siruguppa taluk	17
Figure 2.2. Month-wise and year-wise fieldwork effort (Days) from May 2020 to May 2022	19
Figure 2.3. Month-wise and year-wise fieldwork effort (Hours) from May 2020 to May 2022	19
Figure 2.4. Month-wise and year-wise fieldwork effort (Distance) from May 2020 to May 2022	20
Figure 2.5. The grid cells monitored for GIBs from May 2020 to May 2022 in Siruguppa taluk	20
Figure 2.6. Grids with locations and recordings of GIBs from May 2020 to May 2022 in Siruguppa taluk	21
Figure 2.7. Month-wise detection rate of GIBs from May 2020 to May 2022 in Siruguppa taluk	22
Figure 2.8. The proportion of time spent on major behavioral activities by GIBs	22
Figure 2.9. The intensity of habitat uses by the GIBs from May 2020 to May 2022 in Siruguppa taluk	24

Figure 2.10. Habitat use by GIBs in and around the watchtowers in the forest lands from May 2020 to May 2022 in Siruguppa taluk	24
Figure 2.11. The intensity of habitat uses by GIBs from May 2020 to May 2022 in Siruguppa taluk during different seasons	25
Figure 2.12. The intensity of habitat uses by GIBs between May 2020 to May 2022 in Siruguppa taluk	26
Figure 2.13. The proximity of GIBs to human settlements from May 2020 to May 2022 in Siruguppa taluk	27
Figure 2.14. Tree density of the study area in Siruguppa taluk	27
Figure 3.1. The forest land with points indicating the quadrates laid for sampling the vegetation	32
Figure 3.2. Mean bush height in different forest land in Siruguppa in November 2020	34
Figure 3.3. The extent of the cultivated area within the Agasanur forest lands and the GIB sightings within those land	35
Figure 4.1. Sampling plots for insect density assessment laid in forest land in September 2021 and May 2022	40
Figure 4.2. Sampling plots for insect density assessment laid in the crop field around forest land in May 2022	41
Figure 4.3. Insect density between the forest lands and crop fields in September 2021 and May 2022	43
Figure 5.1. Locations of observed interactions between free-ranging dogs and wildlife in the GIB habitat in Siruguppa	46
Figure 5.2. Species-wise interaction of wildlife with free-ranging dogs in Siruguppa	47

Figure 5.3. Area-wise incidents of wildlife interactions with free-ranging dogs in Siruguppa	47
Figure 5.4. Season-wise number of wildlife interactions with free-ranging dogs in Siruguppa	48
Figure 5.5. Number of days livestock was observed in the forest lands from May 2020 to May 2022	49
Figure 5.6. Number of days livestock was observed in the forest lands from May 2020 to May 2022 in different seasons	49

List of Tables

Tables	Page No.
Table 1.1. Recent population status of GIBs as reported by media and literature	02
Table 1.2. Demographic, land-use, and cattle data of villages present in the patch selected for the study in Siruguppa taluk	11
Table 1.3. Month-wise rainfall data from May 2020 to May 2022 in the study area in Siruguppa taluk	13
Table 2.1. Description of major activities of GIBs considered for recording their activity pattern	16
Table 2.2. Month-wise detection rate of GIBs during the study period in Siruguppa taluk	21
Table 3.1. The formula for calculating the quantitative composition of plant communities	32
Table 3.2. Sampling and vegetation details of forest lands in November 2020	33

Table 3.3. Quantitative composition of shrubs within the quadrates in November 2020	33
Table 3.4. Patch-wise quantitative composition of shrubs within the quadrates in each forest land patch in November 2020	34
Table 4.1. Insect density in forest lands recorded in September 2021	42
Table 4.2. Insect density in forest lands recorded in May 2022	43
Table 4.3. Insect density of post-harvest crop fields recorded in May 2022	43
Table 5.3. Observations of hunting incidents in the GIB habitat in Siruguppa	51

List of Plates

Plates	Page No.
Plate 1.1. Black soil landscape in Siruguppa taluk of Bellary district in Karnataka	10
Plate 2.1. Woolly-necked Storks (<i>Ciconia episcopus</i>) in the GIB habitat in Siruguppa	16
Plate 2.2. Great Indian Bustards in Siruguppa taluk of Bellary district in Karnataka	18
Plate 3.1. Cotton crop fields during pre-monsoon season and in post-monsoon season in the GIB habitat in Siruguppa	30
Plate 3.2. A Great Indian Bustard was sighted in the forest land patch in Agasanur village in July 2020 the and same area in December 2020	31

Plate 3.3. Vegetation in uncultivated crop fields in the GIB habitat in Siruguppa in July 2020 and in December 2020	31
Plate 3.4. Indian Fox and Blackbuck in the forest lands in the GIB habitat in Siruguppa, after the removal of weeds	36
Plate 4.1. Blackbucks foraging in post-harvest crop fields in the GIB habitat in Siruguppa	40
Plate 4.2. Grazing in the forest lands in the GIB habitat in Siruguppa	42
Plate 5.1. Blackbuck killed by free-ranging domestic dogs in the GIB habitat in Siruguppa	46
Plate 5.2. Free-ranging dogs harassing Blackbucks in the forest lands in the GIB habitat in Siruguppa	47
Plate 5.3. Grazing by the locals in the forest lands in the GIB habitat in Siruguppa	49
Plate 5.4. Shepherds and cattle herders from neighboring districts in the GIB habitat in Siruguppa	50
Plate 5.5. Direct incidents of hunting of Blackbucks in the GIB habitat in Siruguppa	50
Plate 5.6. Indirect incidents of hunting of Blackbucks in the GIB habitat in Siruguppa	51

Acknowledgments

We thank Sri. Sanjai Mohan IFS, PCCF-HoFF, Karnataka, for inviting us to take up the study on GIBs, arranging for funding, and supporting us throughout the study period. We thank Sri. Ajai Mishra IFS, PCCF-CWLW, and Sri. Vijayakumar Gogi IFS, PCCF-CWLW, Karnataka for their constant support during the study. We thank Sri. Subhash Malkhede IFS, APCCF-Wildlife, Sri. Kumar Pushkar, APCCF-Wildlife, Karnataka for all the support for the study. We thank Dr. P. Ramesh Kumar, IFS, Sri. Siddaramappa Chalkapure IFS, and Sri. Sandip H. Suryawanshi IFS, Deputy Conservator of Forests, Bellary for all their support and coordination of the study.

We thank Dr. K. Sankar, former Director, SACON, and Dr. S. Muralidharan, Director i/c of SACON, for their constant support, guidance, and encouragement. We thank Dr. P.R. Arun, Research coordinator, SACON for his official process of the project-related activities, and the members of the IRC, finance, administration, and library divisions at SACON for their timely support.

We thank Sri. Kantheppa, ACF, Bellary, Sri. Manjunatha S.V., RFO, Bellary, Sri. Girish K.R., DyRFO, Siruguppa section, Sri. Ashok N. Pujeri, Forest Guard, Raravi beat, and the entire APC-Watchers team (Durugappa, Thotappa, Rajasekara Reddy, Purandara, Durgesha, Mahantesha, Rama Nayak, Harsha Paul, Devadasa, Krishnamraj, Mahesha, and Rajaranga) of Siruguppa section for their support and cooperation during the study period.

We thank Mr. Sai Sailesh for volunteering and helping us collect data the on field. We also thank Dr. Lakshman Prakash for helping us with floral identification.

Executive Summary

The Great Indian Bustard (GIB) is a 'Critically Endangered' large, omnivorous, terrestrial bird that is endemic to the open grasslands, scrublands, and low-intensity agricultural areas of arid and semi-arid regions of India and Pakistan. It is on the brink of extinction, as its population declined steeply in the recent past. The GIB population was estimated to be around 1260 individuals in 1969 and it had shrunk to 300-350 individuals by 2006. The GIB was once found in the states of Punjab, Haryana, Uttar Pradesh, Madhya Pradesh, Rajasthan, Gujarat, Jharkhand, Orissa, Maharashtra, Karnataka, Andhra Pradesh, and Tamil Nadu. But today, it has gone locally extinct in 90% of its former range and is currently found in five states, i.e., Rajasthan, Gujarat, Maharashtra, Karnataka, and Andhra Pradesh. Even within these five states, its distribution has shrunk rapidly and is now found in isolated pockets. Today, the global population of the GIB stands at around 150 individuals. The GIB is accorded the highest protection by placing under Schedule-I of the Wildlife Protection Act- 1972. In Karnataka, once GIBs were recorded from the plains were later found locally extinct until the species was recorded from Siruguppa in the Bellary district in 2006. The need for a scientific understanding of their population, habitat use, habitat quality, and threats was felt and hence, the study was initiated in 2020. The study aimed to assess the current distribution and habitat use by the GIBs in Siruguppa. The study was conducted between May 2020 and May 2022.

The preliminary investigations found that GIBs occur in dry regions with black soil in Siruguppa taluk. The black soil area of the taluk was mapped and it was found as four discontinuous patches. Perhaps the study was conducted in those select black soil patches. The entire study area was overlaid with 1 km² grid cells for assessing habitat use. Human settlements and trees in the study area were mapped and digitized. To search and monitor the GIBs, an information network (of local people and Forest Department personnel) was developed and a search team was created by the Forest Department. Once the GIBs were sighted, the geo-coordinates were collected every 30 minutes, and the age-sex of the individuals were recorded. The GIBs were observed using binoculars until they flew off from the site or roosted in the evening. The bird activities were recorded for the entire observation hours for each sighted bird. The data was collected as time spent by birds on each of these activities. The population size of GIB was projected for the landscape using the age-sex of the individuals and their sight records. We

assessed the insect availability and vegetation in the forest lands. All observed threats were recorded.

A total of 532 days of fieldwork in twenty-five months between May 2020 and May 2022 in search of GIBs, with 7271 hours of field effort yielded sightings of GIBs on thirty-four days. All the detections of GIBs were in 10 grid cells. Of the thirty-four GIB sightings, fourteen were from Agasanur village, eight were from Kuruvalli village, three were from Basarahalli village, and one each from Mitte Sugur and Nagalapura village. The remaining sightings of GIBs were in flight. Of the five forest lands, three of them had GIB presence and movement in them and all the lands were present within these ten grids. Agasanur forest lands together had 31% of all sighting locations. Although the birds were seen using crop fields, they spent most of the time (91% of all sighting locations) in the grassland/scrubland. This shows a clear preference of grassland and scrubland, as compared to agricultural crop fields by the birds. The maximum number of birds sighted on any single day was three (1 adult male and 2 adult females) in 2020 and 2021, but only two birds in 2022. However, there were no sightings of sub-adults or chicks during the study period. A total of 55 hours of observation of the birds during the study period showed that the birds spent 47.7% of their time on resting (1,573 minutes), 40.4% of their time on foraging (1,334 minutes), 7.4% on movement (245 minutes by walking and flying), 2% on vigilance (64 minutes), and 0.4% on preening (12 minutes). The remaining 2.1% (72 minutes) is the gap in observations, spent in finding the bird when it flew from one location to the other. The average area used by the birds during the sightings was ~5.5 ha. Although the study site had many villages, the GIBs were seen using the area by maintaining a mean distance of 3.30 km from the villages. All the grids used by GIBs had less than 3 trees/ha.

During the study period, GIBs were observed flying toward adjoining areas of Andhra Pradesh to the East. To the East is the Rollapadu Wildlife Sanctuary, which had the only population of GIBs in recent times. This indicates that they are using a much larger landscape that includes Siruguppa taluk of Bellary district, and Kurnool and Ananthapur districts of Andhra Pradesh. GIBs have been recorded flying long and far. What was once considered two different populations (Siruguppa and Rollapadu) could be one population. But the lack of exploration and population monitoring in-between Rollapadu and Siruguppa makes it difficult to conclude the population status of GIBs in this landscape.

GIBs in Siruguppa use an agricultural landscape with a very less extent of scrubland that exist as small patches scattered over the region. The entire study area was cultivated during the monsoon months, with crops that have a standing height of >1 m. This resulted in no open habitat left in the region. When crop height exceeded 0.9 m, the GIBs were not sighted in most of the crop fields. The GIBs were seen using the forest lands, thus, these forest lands are important in the management to support the habitat of GIBs, especially during the monsoon seasons.

The forest lands had dense and thick vegetation. As a result of the vegetation analysis, the Forest Department cleared the vegetation of the forest lands by mechanical weeding process. Cotton and Sunflower were cultivated in three small patches in an area of 3.2 ha of land within the Agasanur forest land to attract GIBs. After the cultivation of the crops, the presence and movement of GIBs were not recorded in any of these cultivated patches. Since forest lands are the only large areas of grassland/scrubland habitats present in the area, managing and maintaining them is important. Though mechanical weeding might be the most effective way of managing the vegetation of the forest lands, repeated presence and disturbance caused by the machines may affect the GIBs. Thus, suggested opting for mechanical weeding only for a short duration and one time a year during the non-breeding season, and managing manually for the rest of the time.

Insects are an important part of the diet of GIB. Perhaps insect density and diversity might determine the habitat used by the GIBs. The study provided the baseline data on insect density and diversity in forest lands and the surrounding area.

Free-ranging domestic dogs, hunting of animals by local people, and large-scale grazing by livestock by outsiders were recorded as major threats in the study site. That requires interventions from the Forest Department to protect and manage the GIBs and their habitat in the landscape.