F. No. 1-16/2019 WL
Government of India
Ministry of Environment, Forests and Climate Change
(Wildlife Division)

Indira Paryavaran Bhawan
Vayu Wing, Jor Bagh Road, Aliganj
New Delhi-110003
Date: 11th July, 2019

The Registrar,
National Green Tribunal,
Principal Bench
New Delhi-110001.

Sub: Order dated 04/04/2019 in O.A. No. 385 /2019 in the matter of Centre for Wildlife and Environment Litigation (CWEL) Vs. Union of India & Ors. before the Hon'ble National Green Tribunal, New Delhi-reg.

Sir,

Kind reference is invited to the order dated 04/04/2019 in the above cited case, wherein the Hon'ble NGT has directed the Ministry to furnish a factual report on the deaths of Great Indian Bustard within 2 months.

Therefore, in compliance of the aforesaid order, the undersigned is directed to enclose the "Factual Report on the Great Indian Bustard" for the kind perusal of this Hon'ble Tribunal.

Yours faithfully,

(V.L.Roui Kullai)
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Encl. As above

FACTUAL REPORT ON THE GREAT INDIAN BUSTARD RECOVERY PROGRAM

1. INTRODUCTION

As directed by the Hon'ble National Green Tribunal Principal Bench regarding the conservation of the Great Indian Bustard on 04.04.2019, this factual report on the "Habitat improvement and Conservation Breeding of the Great Indian Bustard- An integrated approach" project carried out by Wildlife Institute of India (WII) is submitted on behalf of the Ministry of Environment, Forest and Climate Change (MoEFCC).

1.1. GREAT INDIAN BUSTARD (GIB)

1.1.1. STATUS AND DISTRIBUTION

The Great Indian Bustard (GIB) is a critically endangered bird with less than 150 individuals left in India/World and in urgent need of conservation actions. These numbers are based on surveys conducted by the Wildlife Institute of India (WII) research team in Rajasthan in 2017-18, Maharashtra in 2017 (Please refer Appendices 3 & 5 in Annexure 1). and information collation by Collar et al in 2018 (Please refer Annexure 2). A copy of the WII's report titled "*Habitat improvement and Conservation Breeding of the Great Indian Bustard- An integrated approach- Annual Progress Report II- 2017-18*" and research paper by Collar et al. in 2018 titled "*Averting the extinction of bustards in Asia*" is annexed herewith and marked as Annexure 1 and Annexure 2 respectively. Long term surveys (2014-18) conducted by the WII and the Rajasthan Forest Department show that the majority of this population is found in Jaisalmer district within and around the Desert National Park, and the Indian Army controlled Field Firing Range near Pokhran. A copy of the survey report titled "*Status assessment of Great Indian Bustard, associated fauna and habitat of Thar – 2016*" is annexed herewith and marked as Annexure 3. Other populations are very small and less than 10 individuals each, found in Abdasa tehsil, Kutch district, Gujarat, Nagpur, Amravati and Solapur districts of Maharashtra, Bellary and Koppal districts in Karnataka, and Kurnool district in Andhra Pradesh. These surveys indicate that the species' numbers have reduced by 75% in last 30 years (Please refer Annexure 4). A copy of research paper Dutta *et al.* in 2010 titled "*Running out of time? The Great Indian Bustard Ardeotis nigriceps- status, viability, and conservation strategies*" is annexed herewith and marked as Annexure 4. Historically, GIB was distributed throughout the western half of India. Currently, the species' range has reduced to 10% of the historical range according to Dr. Asad Rahmani, former director of Bombay Natural History Society and GIB expert from India in the report titled- "*The Great Indian Bustard. Final Report in the study of ecology of certain endangered species of wildlife and their habitats-1989*". The species is listed as Critically Endangered (International Union for Conservation of Nature, 2011) and Schedule-I that accords it the highest level of legal protection under Wildlife (Protection) Act, 1972.

1.1.2. ECOLOGY

The Great Indian Bustard (GIB) is one of the heaviest flying birds' endemic to the Indian subcontinent. They are primarily terrestrial birds with adult males as tall as 122 cm and 11-15 kg and adult females reach up to 92 cm and 4-7 kg. The plumage is predominantly brown and white, and adult males are characterised by thicker and whiter neck with black eyebrow. The Great Indian Bustard is an omnivorous bird primarily feeding on insects, fruits and harvested crops. They live in dry, open landscapes comprising of short grasslands, scrub and rain-fed agriculture. Sexual maturity is attained at the age of 4-5 years in males and 3-4 years for females. They are traditional to their breeding grounds, where, males display in open, well-grazed grasslands to attract females who prefer moderately tall and less-grazed grassland for nesting. Thus, a mosaic of short and tall vegetation with little disturbance is ideal for breeding. Existing research on GIB and related species shows that large heterogeneous agro-grassland patches have highest conservation value and GIB conservation is compatible with traditional, low- intensity land uses. As evidence of this, a copy of the PhD dissertion of Dr. Sutirtha Dutta and research paper by Dutta and Jhala in 2014 titled "*A Planning agriculture based on landuse responses of threatened semiarid grassland species in India*" are annexed herewith and marked as Annexure 5 a & b, respectively.

1.1.3. THREATS

Research conducted by Rahmani (1989) and Dutta *et al.* (2010) show that GIB is a long-lived species with very slow reproductive rate – it lays one egg every 1-2 years, and the success rate of these eggs under ideal situation is around 60-70%. However, the current nesting habitats have high density of predators such as fox and dogs because of availability of more surface water that has reduced the nest success rate to 40-50% based on dummy nest experiment conducted in GIB habitat (Dutta, *unpublished data*). Because of such slow reproductive rate and specific habitat requirements, the species is inherently vulnerable and cannot sustain any added nest predation.

For such long-lived and slow reproducing species, adult mortality is the most decisive parameter for population persistence. Historically, this bird was hunted as game and their population was reduced because of this threat. After the implementation of Wildlife (Protection) Act 1972, their hunting has been reduced but not eliminated. However, adult mortality is still very high due to collisions with power-lines that criss-cross their flypaths. All bustard species in the world are prone to collision with power-lines due to their poor frontal vision and inability to see power-lines from a distance, along with their large size and heavy flight that make it difficult to maneuver in the nick of the time. WII's research has shown that power-lines, particularly high-voltage (33-440 KV) transmission lines with vertical alignment are the biggest threat to GIB as of now. GIB habitats have a high density of transmission lines because of the impetus on renewable energy production in GIB habitats of Rajasthan and Gujarat. This study recorded five GIB deaths in 2017-18 in Jaisalmer district alone based on systematic surveys and anecdotal information, and calculated that ~15% of the GIB population may be dying because of this threat (Please refer Appendix 7 in Annexure 1). Since the natural death rate of large bustards is about 4-8%, the current additive mortality rate due to transmission lines is significantly higher, and if not controlled can result in the species' extinction. Apart from GIB, many other birds also die because of collision/electrocution with these transmission lines at a rate of ~10 birds/km/month totaling nearly one lakh bird deaths annually in 4200 sq km according to this study. A copy of the study so

conducted named "*Bustards, Wires, and the Flight to Extinction*" is annexed herewith and marked as Annexure 6.

While these are the two most important current threats to the species, prevailing habitat loss remains an important threat to the long-term persistence of the species. GIB habitats comprising primarily of short grasslands and scrublands, which were traditionally the support system for rearing livestock have been marginalized as 'unproductive wastelands', progressively converted to other land uses since colonial times, and are not sensibly managed. Earlier, agriculture used to be monsoonal and sparse in bustard habitats and fallow periods used to be prolonged when fields were naturally regenerated. This allowed plenty of food (insects, fruits, crop residues) and grass vegetation cover for the species. But recent developments in irrigation and farming technologies have intensified agriculture and changed cropping practices from seasonal to year-round, intensive crops. Because of frequent ploughing and cropping or use of pesticides, there is lack of food and vegetation cover to meet the ecological requirements of the species. There is a need to regulate such intensive agricultural land-uses to achieve long-term GIB persistence.
Moreover, development activities like mining, industries, wind turbines, and associated infrastructure growth (buildings, electricity and road networks) have caused severe habitat degradation and disturbance to birds. Furthermore, management authorities in many areas exhibit poor enforcement ability due to inadequate staff and infrastructure, lack of motivation, and inaccessibility. Ill-informed forestry practices by State Forest Departments such as plantation of exotic shrub/tree species in deserts and grasslands in the name of afforestation have also degraded the habitat of GIB, chinkara and other open habitat species that prefer visibility and openness.

1.1.4. PROPOSED CONSERVATION MEASURES

Conservationists have been discussing actions required to save the GIB since 1980s, when eight bustard Sanctuaries were established for the species' conservation. However, these sanctuaries included agro-pastoral landscapes where private land rights were not properly settled, and the ensuing legal stringency on land-uses resulted in public antagonism and the extirpation of the species from some of these Sanctuaries. GIB conservation received a fresh impetus around 2010-13, with the constitution of the Bustard Task Force and the development of the National Guidelines for Recovery of Resident Bustards through consultative meetings of conservation agencies under the umbrella of Ministry of Environment, Forest and Climate Change. A copy of the guidelines by Dutta *et al.* in 2013 titled "Guidelines for preparation of state action plan for resident bustards' recovery programme" is annexed herewith and marked as Annexure 7. The above cited action plan highlighted the need of a landscape level conservation approach which was missing from the earlier plan and the habitat around these Sanctuaries became hostile due to intensive land-uses and detrimental infrastructure.

This Recovery Plan suggested:

- Prioritizing the species' landscape through surveys and telemetry, and mitigating threats such as power-lines and poaching therein
- Consolidating known breeding areas of the species by chain-link predator-proof fencing to improve the species' recruitment rate

- Promoting bustard-friendly land-uses/practices by sensitizing and incentivizing local communities
- Finally, while these actions are required on ground, the species is declining at such a rapid rate due to the existing threats, that recovery actions cannot fully reverse the decline in the wild considering the expected time delays of these actions. Hence, a conservation breeding programme should be undertaken to secure a captive population as an insurance against total extinction and to leave the possibility of reintroducing birds in the wild in favourable times when the habitats have been restored by effective field management actions.

1.2. DESERT NATIONAL PARK

Desert National Park (actually a Wildlife Sanctuary) was established in year 1980 over an area of 3162 sq km across Jaisalmer and Barmer districts, with the mandate of conserving desert biodiversity. During the time of its establishment, land rights of people residing inside the Park, then 88 settlements, were not settled. Subsequently, the population size and demand for land increased. Currently, there are 88 villages with 13,000 households in and around the Park. Forest Department controls only 5% of the Park area, in the form of enclosures that are now being managed with the mandate of GIB conservation. The remaining 95% of Park area comprises of private and Revenue lands, with the latter largely being encroached by villagers for agriculture. Earlier, the local people depended on pastoral livelihoods, and would occasionally engage in farming during good rainfall years, when they grew seasonal food crops such as gram, ground nut and millets. However, in the recent years, the market value of *guar* or Cluster Beans has increased dramatically due to their industrial use in hydraulic fracturing. This has led to escalated encroachment by villagers to cultivate and sell *guar*. Because of agricultural encroachment, pastures have depleted, and the herbaceous vegetation are currently largely restricted to Forest Department enclosures. The livestock of local settlements trespass into these enclosures for fodder that creates friction between the Forest Department and local people. This antagonism was exacerbated due to restriction on infrastructure development and in turn constructions detrimental to GIB conservation that have started cropping up haphazardly.

A proposal to rationalize the boundary of Desert National Park (DNP) to exclude the Barmer area, which has lost much of its wildlife values due to large scale agricultural conversions, annexing an equal area in Shahgarh bulge in replacement, and to create an inviolate area of 200 sq km (WII proposal- 500 sq km) in northern DNP as a National Park with the mandate of conserving GIB was prepared. This proposal was viewed by a State Committee and was later shelved. However, given the continuous growth of human demands inside the Park and the need of undisturbed areas by GIB, creating an inviolate area for their conservation through voluntary and incentivized relocation of local people has been proposed by some conservation groups as well as promoting GIB friendly infrastructure development (eg. solar electrification) in villages may be a good solution to the continuing problem of people versus Park.

1.3. WILDLIFE INSTITUTE OF INDIA

1.3.1. GENERAL INTRODUCTION

Wildlife Institute of India (WII), established in 1982, is an autonomous organization under the Ministry of Environment, Forest and Climate Change (MoEFCC), Govt of India, and the technical arm of the former body. The institute is mandated by Government of India to carry out research on various aspects on wildlife conservation, conduct training programmes for capacity building of wildlife managers, build up repository of knowledge of wildlife and provide technical and advisory services to the State and Central Governments in the country. WII's programmes are field based and seek an integration of biological, socio-economic and human aspects of large regional landscapes. As a result, wildlife conservation today means not just providing protection mainly to a few iconic species but that it be holistic and have considerations for humans living in the vicinity as well. WII's research projects being conducted in field sites across the length and breadth of the country are the primary sources of scientific information to help conservation.

WII's aims and objectives are to:

- Build up scientific knowledge on wildlife resources.
- Train personnel at various levels for conservation and management of wildlife.
- Carry out research relevant to management including the development of techniques appropriate to Indian conditions
- Provide information and advice on specific wildlife management problems
- Collaborate with international organizations on wildlife research, management and training
- Develop as a regional centre of international importance on wildlife and natural resource conservation

1.3.2. ACTION REGARDING GIB CONSERVATION BY WII

For GIB conservation, research carried out by WII during 2007 – 11 highlighted the plight of the species and the subsequent advocacy programs resulted in the formulation of the species' recovery guidelines that were used to develop State level recovery plans.

Later, in March 2016, WII launched the project "Habitat Improvement and Conservation Breeding of Great Indian Bustard: An Integrated Approach" in collaboration with MoEFCC, State Forest Departments and NGO partners, with financial support from National Compensatory Afforestation Fund Management and Planning Authority (CAMPA) Funds, and a sum of Rs. 9.95 crores was released for the project implementation, with a five year commitment of 33.85 crore INR. A national launch workshop was organized at WII, Dehradun on 16 May 2016 to appraise partner agencies on the proposed activity plans under the Project.

A) This Project has *an in-situ* component including

A.1. Applied research that aims at: -

- Prioritizing conservation areas for GIB and the endangered Lesser Florican (LF)
- Characterizing threats to these species

- Monitoring bustard populations and habitats
- Understanding population genetics and species' ecology to inform conservation management

A.2. Pilot habitat management to demonstrate best practices of managing GIB habitats including: -

- Pilot mitigation of critical threats
- Breeding enclosure management
- Strategizing conservation planning through delineation of lands for conservation declaration/acquisition

A.3. Capacity-building and awareness that aims at

- Improving protection and enforcement
- Sensitizing stakeholders on bustard conservation
- Raising public awareness on bustard conservation
- Encouraging local land-users to adopt bustard-friendly land-uses

B) The Project has an *ex-situ* component that aims at developing a Conservation breeding program for the Great Indian Bustard as an insurance against extinction and potential reintroduction.

WII's Project team commenced activities on both *in-situ* and *ex-situ* components since March 2016 in collaboration with Rajasthan Forest Departments and NGO partners.

2. PRESENT STATUS OF GIB PROJECT

2.1. SUMMARY OF PROJECT ACTIVITIES CONDUCTED BY WII

Since 2016, WII Project team has conducted the following activities:

- Landscape scale surveys for the GIB in two cycles during 2016-18 and for the Lesser Florican in two cycles during 2017-18, in partnership with State Forest Departments and NGOs to monitor their population status and identify priority conservation areas and threats (Please refer to Appendix 3-5 of Annexure 1).

- Detailed assessment of threats such as power-lines, free-ranging dogs and nest predators in terms of landscape level mapping and their impacts on mortality of GIB and associated species (Appendix 6-8 and main text of Annexure 1).

- Telemetry in Kutch, Gujarat and Jaisalmer, Rajasthan to understand the species' ranging patterns, ecology and prioritize power-lines for mitigation.

- Examination of genetic composition and structure of GIB population.

- Examination of social aspects of local people residing in/around DNP.

- Pilot management measures such as pilot installation of bird diverters on power-lines for demonstration.

- Sterilization of 801 dogs in/around DNP to manage their population in partnership with Humane Society International (HSI).

- Designing predator-proof enclosures to improve GIB recruitment.

- Training of frontline Forest Department staff in wildlife surveys.

- Sensitization of Indian Army (Pokhran Field Firing Range) and power agencies on their roles in GIB conservation.

- Other awareness, training and workshop programs with various stakeholders for GIB conservation

All activities under the *in-situ* component have been initated and most of the targets/milestones have been achieved. Please refer details of the above activities in Annexure 1.

2.2. DETAILS OF KEY PROJECT ACTIVITIES

2.2.1. LANDSCAPE SCALE SURVEYS FOR THE GREAT INDIAN BUSTARD AND LESSER FLORICAN 2017-18

Since 2014, Wildlife Institute of India and Rajasthan Forest Department have been conducting joint surveys to understand the current status, distribution patterns, and local contexts of key conservation-dependent species in Thar to develop scientific management plan. Persistence of GIB critically depends on Thar, where ~75 % of the global population resides. The project team assessed the status of native and conservation-dependent species such as the GIB, chinkara and desert fox. Non-native and 'problem' species such as free-ranging dogs, wild pigs and nilgai that live alongside the habitat of the GIB, in addition to anthropogenic pressures across 19,728 sq km of potential bustard landscape in Thar spanning Jaisalmer, Jodhpur and small parts of Bikaner and Barmer districts of Rajasthan were also assessed. Systematic surveys were conducted from slow-moving vehicle along transects to record species detections, habitat characteristics in sampling plots, and secondary information on species occurrences. Great Indian bustard and other key species detection data were analysed in Occupancy and Distance Sampling framework to estimate proportion of sites occupied and density/abundance.

During the last four surveys, 38 (2014), 40 (2015), 37 (2016) and 37 (2017) great Indian bustards were detected. Their detection/non-detection in 2-km transect segments (spatial surveys) across the area showed that 6.7 ± 2.9SE % of sites were occupied in 2017. Bird density was estimated at 0.48+ 0.10SE per 100 sq km across all sites and 7.49 + 1.63SE per 100 sq km in used sites (sampling cells of 144 sq km where at least one bird was detected during 2017). Abundance was estimated at 95 + 21SE individuals in the 19,728 sq km landscape, pooling data across 2016-17. The current abundance estimate was lower than the past estimate (140 + 53SE in 2015-16); this could be partly due to inadequate intensive surveys in high-density sites within the Field Firing Range. Hence, WII's GIB project team conducted follow-up distance based line transect surveys in the subset of landscape where the species is distributed (western Thar: 4,068 sq km area, and Pokhran Field Firing Range: 5,184 sq km area) jointly with Indian Armed Forces in March–April 2018, to refine the past estimate. Based on these surveys, abundance was estimated at 128 $\pm$ 19SE individuals in 9,252 sq km great Indian bustard distribution area in Thar. But, there might be a real decline in numbers, as comparison of species' encounter rate across years, keeping sampled sites constant, indicated a non-significant but declining trend between 2014-15 (1.00 $\pm$ 0.41SE per 100km) and 2016-17 (0.83 $\pm$ 0.30SE per 100km).

Our surveys showed an expansion of human artefacts across survey years, wherein the proportion of sampling plots with water source, power-lines, farm-huts and wind turbines had increased annually by 0.12, 0.09. 0.07, and 0.03, respectively, over the last four years. Correspondingly, population of free-ranging dogs showed a remarkable expansion over these years, wherein the proportion of sites occupied increased from 0.15 $\pm$ 0.04SE (2014) to 0.61 $\pm$ 0.09SE (2017), and their encounter rate increased from 4.32 $\pm$ 1.77SE to 23.11 $\pm$ 9.39SE per 100km in sites that were monitored across all years.

The survey in Maharashtra (October 2017) did not yield any GIB detection and population was estimated to be less than 8 birds.
The national lesser florican survey was jointly conducted by the project team with partner agencies in July - September 2017 that yielded a conservative estimate of 264 male territories across the range and an abundance estimate of 340 male territories; highlighting the critical status of this species.

2.2.1. POWER-LINE IMPACTS AND ADVOCACY FOR MITIGATION

Carcass surveys under power lines by WII project team in Thar (2017-18) showed mortality of five GIB, and an estimated death of ~1 lakh birds of over 49 species annually in the ~4000 sq km priority GIB habitat. Power lines across GIB habitat in Thar are causing unsustainably high mortality of 15% of their population. Power lines, especially high-voltage transmission lines with multiple overhead wires, is the most important current threat for GIB. Results of this exercise has been published and widely disseminated to sensitize power agencies, managers, decision-makers and conservation agencies. A copy of this report titled *"Power line mitigation to conserve bustards"* has been annexed herewith and marked as Annexure 10a.

WII GIB project team and Rajasthan Forest Department have organized several collaborative meetings to sensitize power agencies for mitigating power lines for GIB conservation. A detailed exercise was undertaken by the Project team to map GIB habitats, wind turbines, power-line networks, and priority mitigation areas/segments using very high resolution satellite imagery. Subsequently, Project team attended meeting with CWLW Rajasthan and Principal Secretary Energy Department at Jaipur (December 2018), where it was decided that power agencies must mitigate all priority lines mapped by WII in Thar, and a fund of Rs. ca. 100 crores was verbally approved for this action, although the Minutes of this meeting is yet to be issued by the Energy Department, Rajasthan. As decided in this meeting, Project team has worked with RVPNL (State Power Agency) for developing proposals with power-line agencies detailing mitigation measures and costs for various power agencies (December 2018–January 2019) so that this action can be taken up by the Government for approval and expeditious implementation. WII has developed a financial and technical proposal on power-line mitigation that involves burying (undergrounding) of high risk segments and diverter installation on medium risk segments in collaboration with power agencies that has been communicated to the Superintendent Engineer of RVPNL, Jaisalmer for necessary approvals from the Energy Department, Government of Rajasthan. A copy of the proposal titled "*Action and budget proposal Mitigation plan for high-tension power lines in Great Indian Bustard habitat of Thar Desert, Jaisalmer*" is annexed herewith and marked as Annexure 10b. These approvals and the follow-up actions need to be expedited to urgently remove this most pressing threat from priority GIB habitats, as decided in the 20th December 2018 meeting under the chairmanship of Principal Secretary, Energy Department, Rajasthan.

Based on the research carried out by WII (Annexure 21) and request of Director WII to ADG (WL), MoEFCC has also issued directives with supporting information to Central and State Ministries of Power and State Government Chief Secretaries, for expediting implementation of mitigation measures.

Since the High Transmission Electric Power Lines have been proven to be great threat to the GIBs and constant reason for deaths of GIBs due to collision/electrocution with power-lines, the issue was regularly discussed at the level of MoEFCC and various solutions were proposed to be implemented including the identification of critical power lines, putting up of Bird Diverters as well as undergrounding and shifting of the power lines. Samples of various bird diverters were procured from abroad and distributed to power agencies for pilot installation. The Secretary,

MoEFCC through its communication dated 07.01.2019 addressed to Chief Secretary, Government of Rajasthan; Secretary, Ministry of Power; Secretary, Ministry of New and Renewable Energy has requested to take immediate steps in this regard. A copy of communication dated 07.01.2019 is annexed herewith and marked as Annexure 8 collectively. Following this, Ministry of New & Renewable Energy has also issued directives dt. 10.03. 2019 to power agencies to initiate mitigation measures in GIB habitats in consultation with WII. A copy of communication dated 22.02.2019 is annexed herewith and marked as Annexure 9. Subsequently, two power agencies-SITAC and Tata power contacted WII regarding this and have been provided maps of potential and priority GIB habitats in Gujarat and Rajasthan which require mitigation measures.

2.2.2. CONSERVATION BREEDING ACTIVITIES

WII GIB project team held meetings with MoEFCC, State Governments, national/international agencies/experts to initiate conservation breeding program. The tripartite MoA was signed between MoEFCC, Rajasthan Govt. and WII to implement the conservation breeding program and to delineate respective roles and responsibilities (June 2018). The WII in collaboration with International Scientists working on Bustards decided the criteria for selection of the area for the Conservation breeding facility. Fourteen possible sites were reviewed for different criteria and scored. Criteria like rainfall, accessibility, proximity to wild source, habitat and topographic suitability, land ownership, local support, local ecology, water facility, electricity, transportation, temperature, size and shape of site and local community support were all scored after making field visits. Sorsan was selected as the most potential site as it has higher humidity which will allow the birds to breed more frequently (unlike Jaisalmer where droughts are frequent when birds are unlikely to breed), has good road accessibility, a suitable flat grassland habitat in which GIB and Lesser Florican were both found till recent history, land ownership with the Forest Department (FD), local support of people, sufficient water supply and electricity and sufficient area for conservation breeding. Because of these criteria, the site was recommended by national and international scientists working on Bustards, and was later visited and finalized by the Additional Director General, MoEFCC, Chief Wildlife Warden, Rajasthan, Central Zoo Authority, Civil Construction Unity and WII scientists.

Permission to use ~2 sqkm land in Ramdevra, Jaisalmer was given by Rajasthan Forest Department to WII on 5th February 2019 for developing the Satellite incubation and chick-rearing facility. Subsequently, WII has released funds for fencing of the ~2 sqkm site to Rajasthan Forest Department Jaisalmer circle on 15th February 2019. Based on the construction estimate provided by CPWD Jaisalmer, WII has released funds of ~ 92 lakh INR to CPWD Jaisalmer on 4th March 2019, to commence construction of the Satellite Breeding Facility at Ramdevra. WII GIB Project team has subsequently developed, discussed and communicated the designs for the incubation, hatchery, chick-rearing and office facility construction. CPWD Jaisalmer has hired the contractor for this construction through tendering and is in the process of commencing the construction work. Rajasthan Forest Department has also granted permission to use Forest land at Sorsan for the construction of the Main Conservation Breeding Facility. Construction of this Facility will be taken up at a later stage after the completion of the Satellite Facility since wild-collected, captive-reared

birds will be transported to Sorsan that is not possible before the next (2020) breeding season (Please refer to Annexures 16-20),

WII is entering into a collaboration with International Fund for Houbara Conservation, who are the leading expert of bustard captive breeding in the world producing ~30,000 houbara chicks from a center every year. The involvement of IFHC as the technical collaborator will be critical in training the Project staff, handholding the project and providing critical inputs along the course of implementation. The Project investigators visited Abu Dhabi during 27 February – 2 March 2019 for discussing the terms of collaboration and the draft MoU was communicated to Rajasthan Government and MoEFCC for vetting. Following this meeting, a team of IFHC scientists visited Jaisalmer to inspect the *in-situ* areas for egg collection and *ex-situ* site at Ramdevra. Based on joint consultation between IFHC, WII and Rajasthan Forest Department, it was decided that a temporary facility be constructed at Sam, Desert National Park to collect and incubate the eggs from the current breeding season (2019) till the Satellite Facility at Ramdevra is completely constructed. Based on the design inputs provided by IFHC scientists (report attached herewith as Annexure 21), the temporary facility construction process has been initiated by Rajasthan Forest Department at Sam with a deadline for completing the construction by May 2019.

Further details on the above activities are given in section 2.3.

2.2.3 AWARENESS AND OUTREACH PROGRAMS

School awareness campaigns involving >1000 students of 5-12 standards from 16 schools in 12 settlements in priority GIB habitats in Jaisalmer have been carried out during Jan-Feb 2019.

Sensitization and skill development program has been carried out for nature guides in DNP (Feb 2019).

Sensitization of local public in the Desert Festival, Jaisalmer during 17-19 February 2019.

Sensitization workshop for media and power agencies on GIB conservation in New Delhi on 21.02.19 has been conducted, and such activities will continue throughout the year, to generate awareness among local communities and important stakeholders on GIB conservation.

Informal meetings with the Commanding Officer Pokhran Field Firing Range to sensitize Army and appraise them on various conservation activities and issues are ongoing.

2.3. RECENT IMPORTANT UPDATES OF THE GIB PROJECT

- With regard to the activities WII's GIB conservation project, permission to tag up to four GIB has been issued by the Chief Wildlife Warden (CWLW), Rajasthan to WII on 06.02.2019. A copy of communication dated 06.02.2019 is annexed herewith and marked as Annexure 11.

- Subsequently, two female GIB were tagged in DNP during March-April 2019 and their daily activities are being remotely monitored closely since the breeding season will commence. This activity is important to identify their fly paths for prioritizing areas for power line mitigation, develop conservation plans, and to track birds for identifying nests and sourcing eggs for the Conservation Breeding Center.

- The Director, WII through its communication dated 01.01.2019 has requested for grant of permissions for all project activities under the Tripartite memorandum of agreement signed between MoEFCC, WII and Rajasthan Forest Department. A copy of communication dated 01.01.2019 is annexed herewith and marked as Annexure 12.

- The DIG Forest (Wildlife), MoEFCC through its communication dated 17.01.2019, has requested the PCCF & CWLW, Government of Rajasthan to grant permission for collection Eggs/Chicks/Birds of GIB and Lesser Florican for conservation. A copy of communication dated 17.01.2019 is annexed herewith and marked as Annexure 13. Subsequently, permission for collection of six GIB eggs to implement the conservation breeding program has been issued by CWLW, Government of Rajasthan to WII on 03.05.2019. A copy of communication dated 03.05.2019 annexed herewith and is marked as Annexure 15.

- The Director, WII through its communication dated 29.04.2019 has requested for grant of permissions for conducting relevant studies on the species biology, behavior, reproduction, genetics, ecology and management in wild and captivity; collection of biological samples for understanding genetics, disease prevalence as well as develop disease prevention protocol, and forensic examination of mortalities; capture and translocate predators of GIB nest/chicks such as dogs, pigs, foxes, cats and mongooses within Forest Department enclosures in Thar and Sorsan to create a safe zone for breeding and improve GIB recruitment rate. A copy of communication dated 29.04.2019 is annexed herewith and marked as Annexure 14.

- A proposal to manage dog population across Thar Landscape (Jaisalmer) is being developed in collaboration with HSI by WII project team.

- Survey to assess the impact of power-lines on birds is being carried out by WII project team across GIB habitat in Kutch, Gujarat.

- Discussions with representatives from Khetolai village near Pokhran Field Firing Range to manage ~30 sq km agriculture land conducive for GIB conservation and develop a community conservation area model is in process.

- Permission for unrestricted access and right to develop and use >2 sq km land at Ramdevra, Jaisalmer for establishing Satellite Conservation Breeding Centre (egg collection and hatching facility) has been issued by CWLW, Government of Rajasthan to WII on 05.02.2019. A copy of communication dated 05.02.2019 is annexed herewith and marked as Annexure 16. Since this land is Ooran land, Forest Department has sought a resolution from the Gram Panchayat and the latter has granted approval on the use of the

land for conservation breeding purpose. Further to this permission, Rajasthan Forest Department has expressed willingness to construct predator-proof fence around the GIB Conservation Breeding Center, and has requested for the release of 65 lakh INR towards this activity vide its communication dated 13.02.2019. A copy of communication dated 13.02.2019 annexed herewith and is marked as Annexure 17. Immediately after receiving the said request, the fund to the tune of 65 Lakh INR has been released from WII on 15.02.2019. A copy of communication dated 15.02.2019 is annexed herewith and marked as Annexure 18. It is further submitted that the construction work of predator fencing has commenced and the Satellite Conservation Breeding Centre will commence soon. Project team are corresponding with CPWD Jaisalmer for commencing construction of the incubation, hatchery, chick rearing, veterinary and staff outpost facilities within the Satellite Site. Tendering for architect hiring to design the Facilities has commenced. The basic construction of the Satellite site to a functional state will take about six months. A temporary incubation and hatching centre is being set up in existing Rajasthan Forest Department land in Sam village DNP till the facility is constructed in Ramdeora.

- Order for reservation of 3.46 Ha land at at Sorsan, Amalsara village, Baran District for establishing Main Conservation Breeding Centre has been issued by District Collector, Baran on 15.01.2019 in response to the request by Tahsildar, Anta Tehsil and Deputy Conservator of Forests, Baran. A copy of the communication dated 15.01.2019 is annexed herewith and marked as Annexure 19. Permission for use of 6.76 sq km land at Sorsan, Baran District for establishing Main Conservation Breeding Centre has been issued by PCCF & HoFF, Government of Rajasthan to WII on 06.03.2019. A copy of the order dated 06.03.2019 is annexed herewith and marked as Annexure 20.

- WII sent a team of scientists to formalize the collaboration and Memorandum of Understanding (MOU) with International Fund for Houbara Conservation (IFHC) at Abu Dhabi during 28/2/19 – 2/3/19, subsequent to which, IFHC team visited Jaisalmer during April- May 2019 to assist and train the project staff. IFHC is an organization of international repute specialized in Houbara bustard conservation breeding to assist and increase wild populations in its natural habitats across entire species range and is supported by the Government of Abu Dhabi. The MoU is being finalized and currently with the MoEFCC.

- WII has proposed staff training programme for the Conservation Breeding Centre and in this regard, has requested the State Forest Department to issue the annual budget (20-30 lakhs) to cover international travel for training of staff, as approved in the MoA between MoEFCC, Rajasthan Government and WII. A copy of communication dated 29.04.2019 is annexed herewith and marked as Annexure 14. Ex-situ project staff has been sent to IFHC Abu Dhabi for the initial training on incubation and chinck-rearing techniques.

- Rajasthan Forest Department conducted a workshop on 22-23 January 2019 that involved WII Project team, other field specialists, managers, decision-makers and conservationists, to develop a detailed in-situ project document for landscape-scale GIB conservation, through working group discussions/deliberations. This project document is being prepared by WII Project team, a draft of which has been shared with the Rajasthan Forest Department.

3. FINANCIAL UPDATE

Till date, an amount of Rs. 9.95 crores has been spent to implement various *in-situ* and *ex-situ* activities proposed in the project out of Rs. 9.95 Crore released by MoEFCC in the first installment. The second installment of Rs. 7.73 crores has recently been sanctioned by MoEFCC and will be sufficient to cover the proposed activities in the coming year.

4. RECOMMENDATIONS

4.1. Keeping the above scientifically established threats in mind, the following evidenced based actions are recommended by WII that are required to be taken up in time bound manner to achieve the species recovery.

4.2. Mitigate all power transmission lines passing through priority bustard habitats identified by WII (Please refer Annexure 10) by undergrounding cables (where technically/ technologically feasible) or installing bird diverters to make them prominent to birds. The priority areas where this intervention is required has been mapped by the Wildlife Institute of India and a technical-cum-financial proposal has been submitted to RVPNL for necessary approvals from Rajasthan Energy Department for mitigation. This action must be expeditiously implemented in the short-term (1-3 years), as power-line mortality is currently the biggest threat to the species.

4.3. Disallow new wind turbines, solar farms (photovoltaic power stations) from priority GIB habitats and remove existing ones that are in the critical areas. The priority areas where this intervention is required has been mapped by Wildlife Institute of India (Please refer Annexure 10). This action needs to be implemented in the long-term spanning 5-10 years from present.

4.4. Develop predator-proof enclosures of 5-10 sq km area in known breeding sites in and around DNP to improve GIB recruitment, and keep away nest predators by routinely translocating dogs, pigs, foxes, mongoose and other species outside the enclosures using professional trappers. Number of water guzzlers inside the enclosures need to be reduced to curtail availability of surface water that attracts non-native nest/chick predators such as dogs, foxes, pigs and mongooses. Also establish such enclosures in the larger Thar (Jaisalmer) landscape, as identified by joint surveys of WII and RFD. These enclosures need to be developed and will serve as breeding sites and stepping stones for movement across the larger landscape.

4.5. Create an inviolate area of 200 sq km (WII proposal- 500 sq km) in northern DNP as a National Park through voluntary and incentivized relocation of local people (if needed) with the mandate of conserving GIB.

4.6. Delineate priority GIB habitats outside DNP as Eco Sensitive Zones where agro-pastoral practices are regulated to low-intensity through Zonal Management Plans and detrimental

infrastructure such as wind turbines and overhead transmission lines are curtailed. This action needs to be implemented in the short-term (1–2 years).

4.7. Engage with local communities to promote bustard-friendly practices such as stall-feeding of livestock during monsoon – GIB chick-rearing and grass growing season – and cultivating food crops preferred by GIB during monsoon such as gram, ground nut and millets while leaving the fields fallow for the remaining period. These land-uses can be promoted by Rajasthan Forest Department in conjunction with other State Departments, through appropriate financial and other incentive schemes, such as provisioning of fodder for stall feeding or compensatory payments to foregone production cost by opting for low-intensity farming. This action needs to be implemented in the longer scale (4–8 years).

4.8. Reduce poaching of GIB and other wildlife in the Thar landscape by improving protection enforcement through training of Forest Department frontline staff in smart patrolling tools with the help of conservation organizations such as WII and WWF, provisioning of better patrolling equipment, enrolling frontline staff from non-wildlife divisions of Forest Department and local volunteers in this activity, and ensuring trials of convicts. Further, it is to bring to the notice that areas controlled by Armed forces in Jaisalmer District harbor about 50% of the GIB population found in Rajasthan. This secure zone under the control of Army where human activities are minimal is a blessing for the bird on the verge of extinction. Thus, continued cooperation of Army, Air Force and Border Security Force to conserve the GIB and control the incidents of poaching could play a vital role as well.

4.9. Implement the conservation breeding programme by creating an offshore insurance population (if needed) by shipping a batch of about 10 GIB eggs to a state-of-the-art international breeding center such as IFHC houbara breeding center at Abu Dhabi that produces up to 30,000 houbara chicks every year (short-term solution 3–5 years), and meanwhile, establish a national breeding center by training staff, developing a state-of-the art center at Sorsan (main facility) and Ramdevra (satellite facility), where eggs collected from wild can be artificially incubated, hatched, reared and captive bred to create an insurance population that can be reintroduced into the wild.

4.10. To continue with targeted research on GIB to characterize threats spatio-temporally, understand landscape use patterns using satellite telemetry, and objective monitoring of their population status by involving research organizations, understanding of species biology, behavior, reproduction, genetics, ecology and management in wild and captivity of GIB, and collection of biological samples for species identification from carcasses, for disease screening for better understanding of threats, develop disease prevention protocol, and forensic examination of mortalities.

It is thus submitted that the key to conserve GIB is a vital balance and combination of stringent protection measures, scientific habitat management, GIB friendly land use planning, and providing basic amenities as well as livelihood options to local people in priority conservation areas.

5. Annexures

Annexure 1. WII-Habitat improvement and Conservation Breeding of the Great Indian Bustard- An integrated approach, Annual Progress Report II (2017-18)

Annexure 2. Collar et al. 2017. Averting the extinction of bustards in Asia

Annexure 3. Status assessment of Great Indian Bustard, associated fauna and habitat of Thar – 2016 survey report

Annexure 4. Dutta, Rahmani and Jhala 2010. Running out of time? The Great Indian Bustard *Ardeotis nigriceps*- status, viability, and conservation strategies

Annexure 5a. PhD thesis on Ecology and conservation of Great Indian Bustard by 'Sutirtha Dutta

Annexure 5b. Dutta and Jhala 2014. A Planning agriculture based in land use responses of threatened semiarid grassland species in India

Annexure 6. Bustards, wires and flight to extinction. Conservation India. January 2018

Annexure 7. Dutta et al. 2013. Guidelines for preparation of state action plan for resident bustards' recovery programme

Annexure 8. Demi Letters issued by MoEFCC to Secretary, Rajasthan and Ministry of Power and Renewable Energy. dt. 07.01.2019

Annexure 9. Circular issued by Secretary, Ministry of Power and Renewable Energy to Power agencies. dt. 22.02.2019

Annexure 10a. Power line mitigation to conserve bustards. WII Report

Annexure 10b. Action and budget proposal- Mitigation plan for high-tension power lines in Great Indian Bustard habitat of Thar Desert, Jaisalmer. January 2019

Annexure 11. Permission for radio tagging Great Indian Bustard from CWLW, Rajasthan. dt. 06.02.2019

Annexure 12. Permissions to conduct project activities as approved under the MoA for GIB conservation. dt. 01.01.2019

Annexure 13. Letter of permission for collection of eggs/ chicks/ birds of GIB & Lesser Florican from DIG (Wildlife), MoEFCC. dt. 17.01.2019

Annexure 14. Pending issues for undertaking GIB & LF conservation. dt. 30.04.2019

Annexure 15. Permission to collect GIB eggs for Conservation breeding programme from CWLW, Rajasthan. dt. 03.05.2019

Annexure 16a. Fund request for construction of predator proof fence around GIB CBC Ramdeora by CWLW, Rajasthan. dt. 13.02.2019

Annexure 16b. 16b. Fund release by WII to CPWD Jaisalmer

Annexure 17. Fund transfer to CWLW, Rajasthan for construction of predator proof fence around GIB CBC Ramdeora. dt.15.02.2019

Annexure 18. Grant of permission to WII at Ramdeora for CBC by CWLW, Rajasthan. dt. 05.02.2019

Annexure 19. Reservation of non-forest land for Sorsan CBC by District Collector Baran. dt.15.01.2019

Annexure 20. Sorsan forest land allotment for CBC by PCCF & HoFF, Rajasthan. dt. 06.03.2019

Annexure 21. IFHC mission report