

Physical and financial progress report of the project Habitat Improvement and Conservation Breeding of Great Indian Bustards

Funding Agency: National CAMPA Authority

Programme Division: MoEF&CC (Wildlife)

Implementing Agency: Wildlife Institute of India

Partners: Rajasthan Forest Department and International Fund for Houbara Conservation

Total Budget Outlay: 33.85 Cr INR

Project background

The Project “Habitat Improvement and Conservation Breeding of Great Indian Bustard” is funded by MoEF&CC (National CAMPA Authority). The first phase of the Project had a sanctioned budget of 33.85 crore INR, and is nearing completion (FY 2016 - 23). Details of project objectives, activities and outcomes in Phase I are listed below. The Project has made above-expected progress, offsetting previous delays, and is currently on track. It needs to be continued and strategically scaled up, to achieve the species’ recovery.

Table 1: Key physical and financial progresses of the project

Year	Key Physical Progress	Financial Progress
2016	<ul style="list-style-type: none"> Project launch workshop Meetings with Rajasthan Forest Department, MoEFCac & IFHC for partnership and drafting of Tripartite MoU Thar landscape survey of GIB & associated fauna Ecological studies on GIB initiated 	First instalment 9.95cr Fully utilized
2017	<ul style="list-style-type: none"> Assessment of powerline impacts on birds Range wide lesser florican survey Thar landscape survey of GIB & associated fauna 2 GIB tagged in Gujarat Assessment of nest predators in Desert National Park (DNP) enclosures Assessment of impact of dogs on native fauna in DNP 	
2018	<ul style="list-style-type: none"> Tripartite MoU signed Range wide lesser florican survey IFHC collaboration Site selection for Conservation breeding centers Sterilization of 801 dogs in DNP 	
2019	<ul style="list-style-type: none"> Establishment and operationalization of Sam CBC Egg collection & successful rearing of 9 GIB chicks Construction of Ramdevra facility commenced 2 GIB and 1 LF tagged in Rajasthan Delineation of Priority GIB Areas 	
2020	<ul style="list-style-type: none"> Incubation and rearing of 7 GIB from wild eggs Establishment of temporary LF center in Bijainagar 	Second instalment 4.29 cr

	<ul style="list-style-type: none"> ● Egg collection and rearing of 2 LF ● 3 GIB and 2 LF tagged in Rajasthan ● Recommendation on legal issues pertaining to GIB 	Fully utilized
2021	<ul style="list-style-type: none"> ● Egg collection and successful rearing of 4 GIB from wild collected eggs ● 3 GIB and 2 LF tagged in Rajasthan ● Wildlife survey in Bikaner, Rajasthan ● Refinement of Priority GIB Areas 	Third instalment 2.86 cr Fully utilized
2022	<ul style="list-style-type: none"> ● Egg collection and successful rearing of 9 GIB ● Establishment & operationalisation of Ramdevra Center ● Transport of 9 chicks from Sam to Ramdevra ● 9 LF eggs collected and chicks reared ● Predator removal (~90 dogs) ● 4 LF tagged in Rajasthan 	Fourth instalment 5.93 cr Fully utilized
2023	<ul style="list-style-type: none"> ● First successful natural captive breeding of GIB ● Egg collection and rearing of 6 GIB from wild eggs ● 6 LF eggs collected and chicks reared ● Training on artificial breeding techniques at IFHC ● Predator removal (~35 dogs), 12 foxes, 2 cats, 3 mongoose and 1 monitor lizard ● 2 GIB tagged and 1 LF tagged ● Nature education of school children in Jaisalmer ● Sorsan Lesser Florican breeding facility construction commenced 	Fifth instalment 4.53cr Fully utilized
2024	<ul style="list-style-type: none"> ● Training of birds on artificial breeding ● Natural captive breeding is ongoing ● Thar landscape survey of GIB and associate fauna ● Camera trapping surveys for population estimation of nest predators ● Efficacy assessment of bird diverters through powerline survey is ongoing 	Sixth insalment 6.29 cr 5.96 cr utilized Remaining 35 lakhs committed for expenditure by 31/03/2024

Table 2: Detailed summary of activities conducted and their outcomes for project objectives

Objective	Activities implemented (Phase I)	Outcomes & milestones
<p>1. Conservation breeding</p> <p><i>Develop & run conservation breeding centre to secure captive populations of GIB & (if needed) LF</i></p>	<p>Conservation Breeding Program for GIB & LF is being implemented by WII in collaboration with RFD, MoEF&CC & IFHC, the global expert in bustard breeding. A tripartite Memorandum of Agreement (MoA) has been signed between MoEF&CC, RFD & WII in July 2018, and A Memorandum of Understanding (MoU) has been signed between WII & IFHC in September 2022.</p> <p>For GIB, a pilot conservation breeding facility has been established at Sam, Jaisalmer that houses a captive population of 13 birds (3-5 years age) from wild-laid, artificially hatched, and hand-reared chicks and additional 3 chicks of ~1 year age. Breeding of birds reared in captivity has started since March 2023. A larger, long-term facility has been developed at Ramdevra that houses 8 birds of ~2 year age and 5 birds of ~1 year age. The current captive stock is of 29 birds (including 8 chicks of 2023) with 6 founders (adult breeders).</p> <p>Conservation Breeding of LF has also commenced in a temporary centre at Bijainagar, Ajmer and 10 captive individuals secured from wild-laid, artificially hatched eggs are being reared there. A team of specially trained technicians from WII is raising these captive birds & developing the scientific husbandry approach for the species.</p>	<p>Establishment of bustard conservation breeding facilities</p> <p>Securing of partial founder populations of Critically Endangered GIB & LF</p> <p>Training of a technically competent team for implementing conservation breeding activities</p> <p>Commencement of captive breeding in GIB</p>
<p>2. Applied research</p> <p><i>a) prioritize conservation areas,</i></p> <p><i>b) characterize threats,</i></p> <p><i>c) monitor populations & habitats,</i></p> <p><i>d) assess local communities' livelihood concerns,</i></p> <p><i>e) understand species' genetics to inform conservation</i></p>	<p>2a. i) The GIB population & habitat was assessed in ~20,000 km² area in Rajasthan, in collaboration with the State Forest Department & Indian Army during 2016 & 2017-18, & the current abundance has been estimated at 128 (SE 19; 90.76 - 165.24, 95% CI) birds.</p> <p>ii) The GIB population in Maharashtra was assessed in collaboration with Maharashtra Forest Department in 2017, & the current abundance was estimated at <8 birds.</p> <p>iii) Demographic parameters such as fecundity, nesting success and chick survival were assessed for the Jaisalmer GIB population, through a combination of telemetry and ground surveys. Preliminary results indicate that nesting success in the wild is very low (~35%) but rate of re-nesting is high (each female lays about 4 eggs per year); this indicating that egg collection for the captive breeding program has minimal negative impact on the wild population.</p> <p>iv) Intensive characterisation of GIB habitats in and around Desert National Park to quantify vegetation, arthropod (primary food), and human disturbances. Arthropod biomass in GIB breeding areas (protected grasslands) was found to be much higher than other outer areas.</p>	<p>Information on GIB numbers & distribution in Rajasthan</p> <p>Information on LF numbers & distribution across range</p> <p>Telemetry data of 12 GIB & 9 LF</p> <p>Knowledge of demographic parameters of GIB - identification of low nest and chick survival as a roadblock for rapid population recovery</p> <p>Prioritisation of threats for GIB - identification of powerlines as critical threat for adult GIB</p> <p>Identification of free-ranging dogs as a critical threat for chinkara and associated fauna</p> <p>Basic understanding of genetic status and</p>

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	<p>v) The LF population & habitat was assessed across its global range in collaboration with range State Forest Departments & NGO partners (BNHS, TCF, HYTICOS) during 2017-18, & the current abundance was estimated at 426 (174–805, 95%CI) breeding territories. Important breeding areas for LF were identified based on these surveys.</p> <p>2b. i) Tagging & tracking of 12 female GIB (2 in Gujarat & 10 in Rajasthan) is providing insights into their phenology, ranging patterns, seasonal habitat use, & critical resource requirements (breeding, chick-rearing, foraging, roosting etc.) that are directly informing conservation management. Information on their space use (38-1038 km² 95% MCP homerange) is aiding identification of intensively used areas that need highest protection & research-informed management.</p> <p>ii) Tagging & tracking of 7 male and 3 female LF in Ajmer is providing insights into seasonal movements, habitat use & climatic requirements. All tagged birds moved from Ajmer towards Madhya Pradesh, Maharashtra & Karnataka in November, revealing unknown migratory routes, wintering sites, & the need for inter-state collaborative conservation actions.</p> <p>2c. i) Carcass surveys demonstrated high collision risk of GIB & associated birds with powerlines in Rajasthan & Gujarat, to the tune of ~15% annual mortality of GIB that, if not mitigated, can single-handedly cause its extinction in the coming 10-20 years. Additionally, powerline induced deaths of all birds were estimated at about 6.2 & 2.3 individuals km⁻¹ in Thar & Kutch, respectively, that amounts to annual bird mortality of ~20,000 per 1000 km² area in these landscapes.</p> <p>ii) Assessment of free-ranging dog population showed abundance of 1804 (SE 462) dogs in & around DNP, Rajasthan. Radiotracking of 9 dogs indicated homeranges of 20 km² & high predation rates of 10 chinkara per dog per year, amounting to an unsustainable 33% cropping of chinkara population annually.</p> <p>iii) Pesticide surveys across LF range indicated the prevalence of organophosphates, pyrethroids, imidazolinone, triazine & neonicotinoids. Analysis is ongoing & results will be prepared in a few months.</p> <p>2d. Sociological questionnaires on 158 households in 20 villages & 10 Dhanis in & around DNP examined socioeconomic profile, human-animal conflict, pastoral institutional arrangements, & conservation attitudes. These surveys will facilitate community based conservation initiatives in the landscape.</p>	<p>structure of GIB populations across range states</p>

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	<p>2e. Genetic analysis of GIB DNA samples indicated low mt-DNA & microsatellite allelic diversity, three genetically distinct populations (Rajasthan- Madhya Pradesh-Maharashtra, Gujarat & Andhra Pradesh), & evidence of recent migration between Rajasthan, Madhya Pradesh & Maharashtra. These inferences along with a recently completed full genome mapping will inform future <i>ex-situ</i> & <i>in-situ</i> managements.</p>	
<p>3. Capacity-building & awareness</p> <p><i>To improve protection, sensitize stakeholders & raise conservation awareness</i></p>	<p>3a. i) Capacity building of >200 frontline staff of bustard range State Forest Departments (Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Andhra Pradesh) through a series of field training workshops on grassland/desert biodiversity assessment during 2016-18. Additional capacity building training of Rajasthan forest frontline staff on desert biodiversity conservation techniques and wildlife tools (2020-21). Technical capacity building of ground staff in Desert National Park and Ajmer Forest Division, through regular interactions and sharing of information (2016-24).</p> <p>3b. i) Meetings with Hon'ble C.M., Rajasthan, State Forest Departments of Rajasthan & Gujarat, & partner NGOs, to initiate Project activities & develop conservation roadmap</p> <p>ii) Series of workshops on GIB conservation in collaboration with State Forest Departments & partner NGOs to sensitize Indian Armed Forces at Jodhpur (2016) & Pokhran (2018-20), power agencies & their regulatory bodies at New Delhi, Jaipur, Jodhpur, Kutch & Dehradun, & local people of Jaisalmer & Kutch</p> <p>iii) Shared evidence-based recommendations on legal issues pertaining to GIB conservation in the Hon'ble Supreme Court, Jodhpur High Court & NGT Delhi & Bhopal</p> <p>iv) Provided technical inputs to several power agencies (RVPNL, JDVNL, GETCO, Power Grid, Tata Power, Essel Infra, Enel Green Power, Sterlite Power, General Electric, Sitac Management, Sprng Energy, Essel Surya, Siemens Gamesa, Skipper Limited), project funders (IFC & ADB), regulatory bodies (MoEF&CC, CEA, MoP, MNRE, Rajasthan Energy Dept) & diverter developers (A&S, Indolite, Welkin) to implement power-line mitigation measures in Important GIB areas across the species' range, in accordance with government regulations, through physical & online meetings. Provided policy advisory for GIB conservation to MoEF&CC in cases related to GIB conservation in Hon'ble NGT and SC.</p> <p>3c. i) Preparation & distribution of outreach materials (posters, t-shirts, caps, books, bags, & brochures) &</p>	<p>Knowledge of bustard population assessments among frontline staff</p> <p>Technical understanding on powerline mitigation measures among concerned stakeholders</p> <p>Awareness among local people and school children on GIB and ongoing conservation efforts</p>

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	<p>a documentary film on GIB conservation (available at youtu.be/XR5Z_rA7xd0). An updated video-documentary on the species and its conservation is currently under preparation.</p> <p>ii) Conservation education of ~4000 schoolchildren in 22 schools located around 18 key GIB area villages of Jaisalmer. Awareness sessions in schools of Lesser Florican areas in Ajmer district.</p> <p>iii) Wildlife tourism skill development workshop at Jaisalmer involving nature guides (2019)</p> <p>iv) Conservation awareness stalls at Desert Festival in Jaisalmer and Pushkar Festival, Ajmer, with cumulative visitation of >20,000 tourists (2018-24)</p> <p>v) Sensitization of public figures at the Conservation Breeding Facility & sensitization of media in a national workshop at Delhi</p>	
<p>4. Pilot habitat management</p> <p><i>Demonstrate best practices for habitat improvement through pilot/ experimental surgical interventions that can be replicated by State Forest Departments</i></p>	<p>4a. i) Priority & Potential GIB areas were mapped in Rajasthan & Gujarat based on population / habitat surveys & telemetry data. Since overhead power-lines are the most critical current threat to GIB, conservation measures such as undergrounding of certain existing lines and mitigation of upcoming lines through undergrounding (in Priority GIB area) and installation of high quality bird flight diverters (in Potential GIB area) was recommended.</p> <p>ii) The Priority GIB area in Jaisalmer outside of DNP & Pokhran Field Firing Range (~7000 km²) was jointly suggested with RFD as an Eco-sensitive Zone, to legally prohibit detrimental infrastructure. Data on priority GIB area in Kutch aided in the delineation of Eco-sensitive Zone by Gujarat Government.</p> <p>4b. Enclosure management activities such as repair & maintenance of chain-link-fence & pilot translocation of predators such as monitor lizards, foxes and dogs were carried out in key breeding enclosures of DNP (PPC, Sudasari, RKVY) in collaboration with Rajasthan Forest Department (2020-24).</p> <p>4c. i) Powerlines were mapped across Rajasthan & Gujarat GIB landscapes, & existing risky lines of 1342 km in Rajasthan & 883 km in Gujarat were identified for mitigation, out of which about 250 km (Rajasthan) and 280 km (Gujarat) were of high-risk and recommended for immediate undergrounding jointly by WII and RFD. Powerline mitigation advocacy report & a technical/financial proposal for Rajasthan were prepared. These maps, reports & recommended actions were communicated to State Governments, MoEF&CC, MoP, MNRE & CEA.</p>	<p>The Project research and advocacy influenced the ongoing power line mitigation by concerned agencies in GIB habitats that will reduce adult mortality once the powerline threat is effectively mitigated</p> <p>Ongoing efforts of predator control & jump-start strategy in breeding areas can improve in-situ recruitment</p>

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	<p>ii) Diverters of various makes (>400 pcs) were procured from international & national producers & distributed to power-agencies that were pilot installed to test their designs, durability & effectiveness.</p> <p>ii) 801 dogs from 23 villages in & around DNP were sterilized in collaboration with Humane Society International & dog population are being monitored in control & treatment villages to test the effectiveness.</p> <p>iii) Translocated nest predators: >300 free-ranging dogs from GIB breeding habitats in Pokhran and a few foxes & monitor lizards from GIB breeding enclosures.</p> <p>iv) Provided technical support and evidence-based recommendations to RFD on various management matters, inter alia, breeding enclosure management, rescue and treatment of injured wild birds, regulation of the spraying of Malathion by Jaisalmer District Administration to control locust outbreak in GIB habitats; mapped Malathion spraying activity, & removed sprayed/dead locusts from key GIB breeding enclosures (Ramdevra) to avoid poisoning, in collaboration with Rajasthan Forest Department.</p>	