JATAYU SOLICITS JUDICIOUS USE OF VETERINARY DRUGS FOR ITS SURVIVAL

MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
GOVERNMENT OF INDIA

CENTRAL ZOO AUTHORITY
Government of India

FOREST & WILDLIFE DEPARTMENT
HARYANA

BNHS INDIA CONSERVING NATURE SINCE 1883

Jatayu Conservation Breeding Centre
JCBC

PROCEEDINGS OF THE TECHNICAL WORKSHOP FOR CZA-COORDINATED VULTURE CONSERVATION BREEDING PROGRAMME

20-21 SEP 2021

VCBC
PINJORE . HARYANA

PROCEEDINGS OF THE TECHNICAL WORKSHOP FOR THE CENTRAL ZOO AUTHORITY COORDINATED VULTURE CONSERVATION BREEDING PROGRAM

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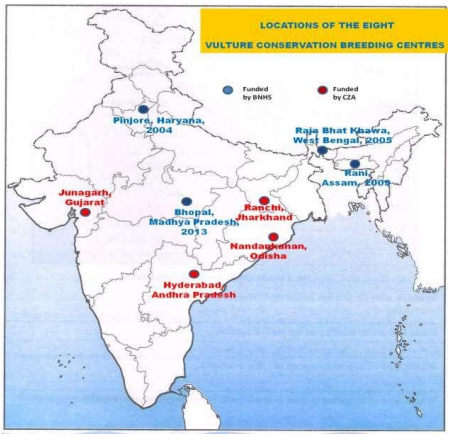
Background

The Vulture Conservation Breeding Program is a flagship program of the Central Zoo Authority. One of the major recommendations of the Action Plan for Vulture Conservation of the Government of India, 2006 was to establish a Conservation Breeding Program for vultures as an insurance against their extinction.

The conservation breeding program was established for the three *Gyps species* of vultures i.e., White-rumped (*Gyps bengalensis*), Long-billed, (*Gyps indicus*) and Slender-billed (*Gyps tenuirostris*). The first Conservation Breeding Centre was set up in Pinjore, Haryana and subsequently, seven more centres were established in different States.

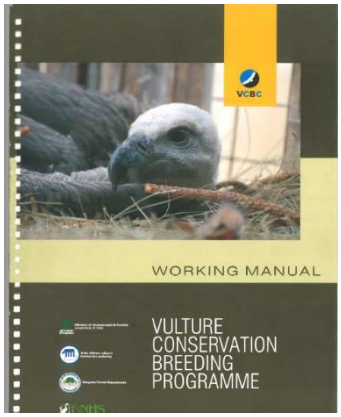
Till the late 1980s, these three species were very common across India, but their populations crashed in the mid-nineties due to the proscribed use of thedrug diclofenac in the large animal (cattle) industry. The vultures were exposed to diclofenac when they fed on the carcasses of cattle who had been administered diclofenac for the within72 hours of death. The residue of the drug was extremely toxic to vultures, and they died, mainly succumbing to visceral gout.

VCBC, Pinjore, Haryana



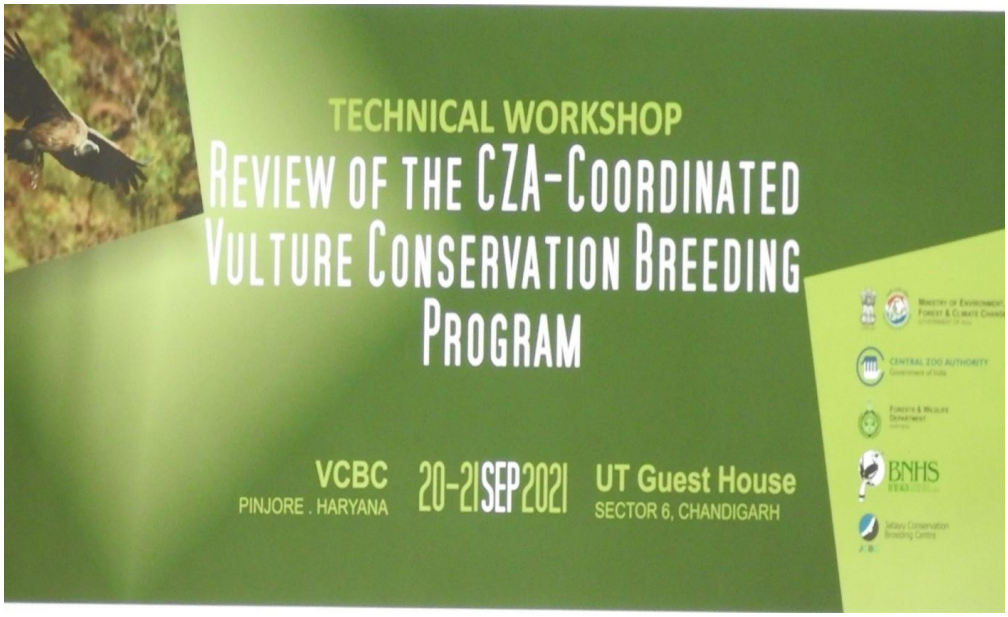
Location of 8 Vulture centres in the country

A working manual for vulture conservation breeding was published in 2014. It was compiled by the Central Zoo Authority and provided details of the establishment a nd management of a conservation breeding centre in terms of site selection, size and aviary design etc. It also elaborated on the husbandry practices, veterinary care, double-clutching and artificial incubation protocols.



Introduction:

The Vulture Conservation Breeding Program, initiated in 2006 has been running for more than a decade. In 2014, a coordinating meeting of the expert group on conservation breeding was held for the vulture conservation breeding program of Central Zoo Authority. This technical workshop was planned as a follow-up to the meeting of 2014. The technical workshop was organized on September 20 and 21, 2021 at the Vulture Conservation Breeding Centre (VCBC), Pinjore Haryana.



The technical workshop was attended by the Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden of Haryana, Chief Conservator of Forests and Chief Wildlife Warden of Chandigarh, Deputy Inspector General of Forest (HQ), CZA, Director, Bombay Natural History Society (BNHS), the Directors, Centre Managers and Veterinarians/Biologists of the coordinating and participating zoos, and BNHS-State government-run vulture breeding centres. [The list of participants is placed in Annexure 1]

Objectives

To provide hands-on training to personnel involved in the conservation breeding of the three *Gyps* species of vultures in various centers Review the status at each of the conservation breeding centers in terms of housing infrastructure and technical manpower and challenges with existing infrastructure such that each zoo is equipped to initiate successful conservation breeding.

The technical support that VCBC, Pinjore, and CZA would provide include:

1. Identifying breeding stock/founder population.
2. Facilitate shifting of individuals from VCBC, Pinjore to the participating zoos that have infrastructure so that the founder population of 25 pairs is established in each centre [as per plan]
3. Profile the birds in captivity [Age, sex, genetics, pedigree]
4. Streamline individual centres husbandry practices following standardized protocolsdeveloped over the years at VCBC, Pinjore.
5. Initiate training programmes for technical resource personnel.
6. Provide support in the development of a conservation breeding plan incorporating all the recognized participating centres.
7. Meet the objectives defined in the Action Plan for Vulture Conservation 2020-2025 in a time-bound manner.

Day 1: September 20, 2021

The workshop commenced with remarks by Dr. Devender Kumar, Evaluation and Monitoring Officer, CZA who emphasized the need of regular review meetings of Conservation Breeding Programs to exchange views between the coordinating and participating zoo. He further stressed the need for shifting appropriate number of birds from the Pinjore Centre to the participating zoos.

Dr. Bivash Pandav expressed his happiness to see all involved in Vulture Conservation Breeding Program together in a meeting. He said BNHS is ready to share expertise with all the centres and would like to shift birds to other centres which have the required infrastructure.

Introduction of Participants

There were 22 participants (Zoo directors, Biologists and Veterinarians) from 6 states. Centre Managers from all the four Vulture Centres run by BNHS in collaboration with the State Forest Departments were also present. There were four technical experts from CZA (Appendix-1).

The entire workshop was conducted under the guidance and coordination of Dr S P Yadav, IFS, Member Secretary, CZA and Dr Sonali Ghosh, IFS, DIGF (HQ), CZA. Sh Jagdish Chandra PCCF (Wildlife) &CWLW, Haryana chaired the valedictory and in presence of Sh Dubendra Dalai, CWLW, Chandigarh and Dr Sonali Ghosh, IFS, DIGF (HQ), CZA. A Manual for keepers at the Vulture Conservation Breeding Centres was released at the time.

Technical Session

Day 1: September 20,2021:

Session I: An overview of the vulture conservation efforts in the country and rationale for a Conservation Breeding Programme

This was given by Dr Vibhu Prakash, Vulture Conservation Breeding Centre, Pinjore. He discussed the crash in vulture populations in mid-nineties and described at length the benefits of regular monitoring. He said that by the end of the year 2000 more than 97% of the population of the Gyps vulture had disappeared. The cause of the crash in the vulture populations was identified to be the veterinary use of Diclofenac, a non-steroidal anti- inflammatory drug. The setting up of the Vulture Conservation Breeding Programme was an immediate requirement as an insurance against extinction by the Vulture Recovery Plan released in 2004 and Action Plan for Vulture Conservation, 2006.

Session II Guided Tour of the Centre

The team of BNHS gave a guided tour of the facility to all the participants. They were shown the prerelease aviary from where the vultures were reintroduced in the wild using soft release protocols. The participants were explained the design and functioning of colony aviaries display aviaries, breeding aviaries, green aviaries, and nursery aviaries.

Two birds were trapped in a breeding aviary to demonstrate the trapping techniques. A healthassessment was conducted and the procedure of drawing the blood was demonstrated. The marking techniques such as ringing and microchipping of birds was also demonstrated by the centre veterinarian. A typical perch, a nest cot and netting were shown to the participants.

Session-III: Artificial incubation and husbandry techniques

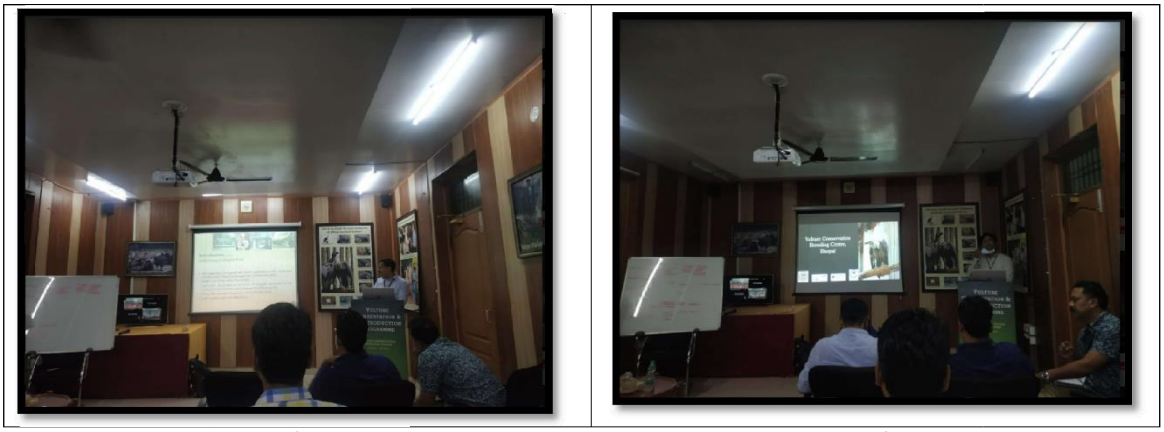
A presentation on the artificial incubation and chick rearing describing in detail the incubators and the temperature maintenance, hatchers, incubator and brooder room and nursery aviaries was done. Salient features like maintaining the incubator room at a temperature ranging between 19-21°C for optimum functioning of the incubators, number of eggs per incubator for best success, maintenance and monitoring of eggs while in the incubator and at the time of pipping and hatch were explained.

The centre had so far bred 329 vultures in captivity of all the three species by successful artificial incubation, double clutching and chick rearing techniques.

The participants were taken to the incubator and brooder facility for a hands-on demonstration. This was followed by visit inside a Colony Aviary to see the infrastructure and facilities provided to the vultures. The participants were then shown the CCTV monitor room where observations on captive birds in various aviaries was explained. Monitoring data sheets were also distributed. The medical facilities were also visited.

Day 2: 21st September 2021

Session-IV: The Morning session focused on a SWOT [Strengths, Weakness, Opportunities and Threats] analysis of the existing infrastructure at the participating zoos and the BNHS run centres. The analysis was done based on the presentations made by the personnel from the participating zoos [Annexure 2]



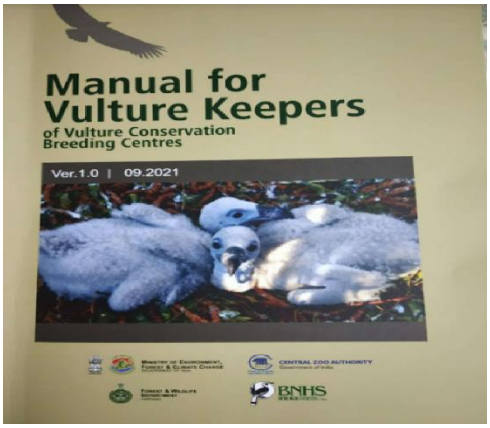
SWOT analysis of VCBC, Assam | SWOT analysis of VCBC, Bhopal

The data on *Gyps* species in captivity in recognised zoos available at the Central Zoo Authority was presented along with the analysis and a way forward by the Scientific Officer, Central Zoo Authority.

SWOT analysis of VCBC, Assam | Plenary session

The workshop concluded with a plenary session with Mr. Jagdish Chander, IFS, Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden, Haryana, Mr. Dubender Dalai, IFS, Chief Conservator of Forests and Chief Wildlife Warden, Chandigarh, Dr. Sonali Ghosh, IFS, Deputy Inspector General of Forest, CZA, Dr. Bivash Pandav, Director, BNHS and Dr. Vibhu Prakash, Deputy Director, BNHS. The discussion centered on how to take vulture conservation breeding forward in line with the Action Plan for Vulture Conservation (2020- 2025), mitigate the persecution of vultures based on negative perception and messaging [print and electronic media], impart training and initiate conservation awareness among the masses. The establishment of vulture safe zones, in areas where conservation breeding centres exist was also put forth and the extension of the conservation breeding initiatives to the other six remaining vulture species found in India was discussed.

A manual prepared by the Bombay Natural History Society with the guidance and technical support of the Central Zoo Authority for Vulture Keepers at Vulture Conservation Breeding Centres was released.



Summary and Recommendations:

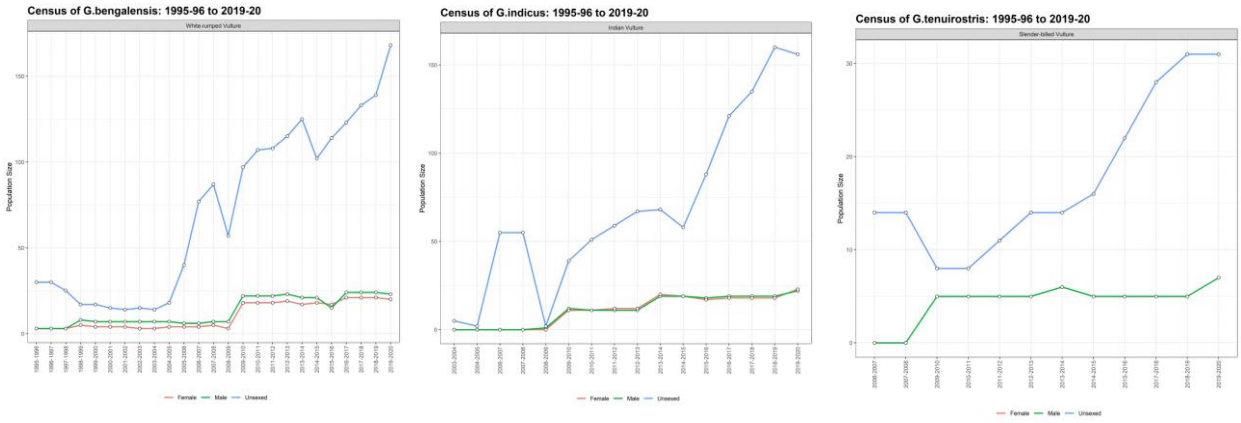
(1) The 99thTechnical Committee of the Central Zoo Authority held on January 22, 2021, had recommended the preparation of a plan for the movement of vultures that are managed as part of conservation breeding programs between coordinating and participating zoos.

➢ *Previous evaluation report of the 2014 can be revisited and a plan for shifting of the birds to the facilities with appropriate infrastructure to be taken up as a priority. Evaluation of the existing vulture conservation breeding centres may be done on need basis by Dr. Vibhu Prakash, Deputy Director, BNHS with a fixed timeline.*

(2) A comprehensive account of Vulture conservation breeding combining information based on presentations during the workshop, current holding pattern of Vultures in coordinating and participating zoos and housing and husbandry expertise was presented by the Scientific Officer, Central Zoo Authority. The presentation also included population level information derived from long-term inventory records and national studbook of the species.

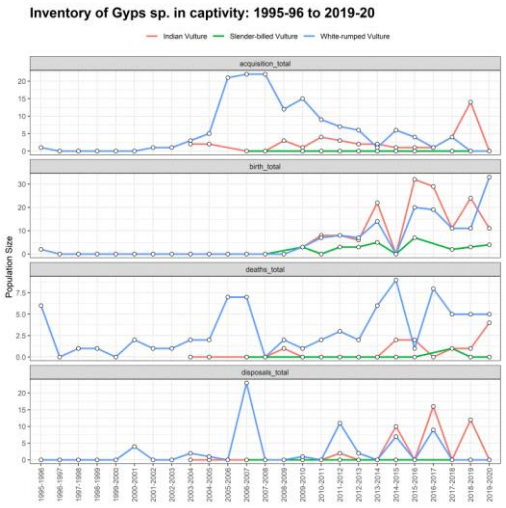
(3) The key points highlighted during the presentation were:

a) The captive populations of all the three *Gyps* species viz. *Gyps bengalensis*, *Gyps indicus* and *Gyps tenuirostris* has steadily increased over the years. While there are more than 100 individuals of both *G. bengalensis* and *G. indicus*, there are just over 30 individuals of *G. tenuirostris*. *G. bengalensis* has been housed in captivity for more than 25 years, whereas the other two species have been in captivity since the mid-2000's.

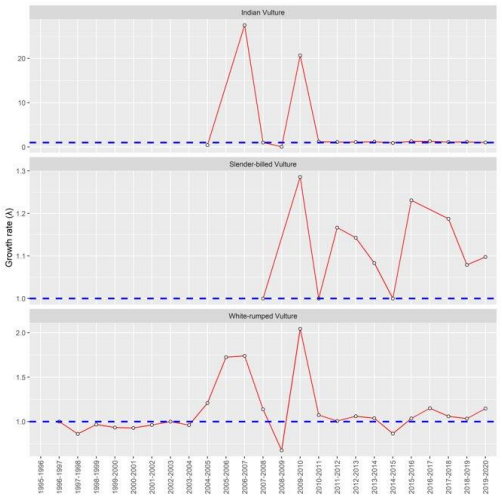


b) Detailed inventory records i.e., acquisitions, births, deaths, and disposals of these species are indicative of (i). fairly consistent breeding, (ii) controlled mortality rates, and (iii). fewer acquisition and disposals.

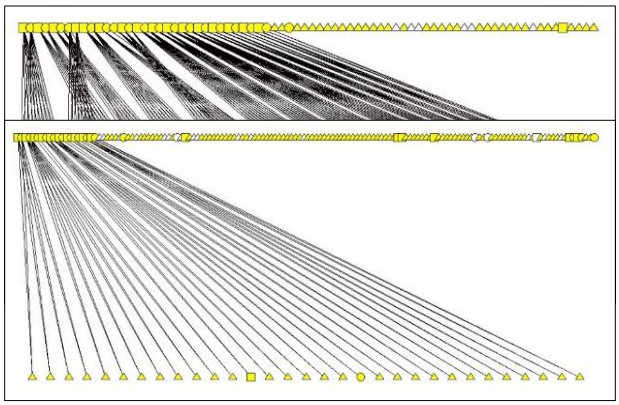
c) The growth rates (lambda – λ) derived from annual census trends were indicative of highly variable rates in the initial years of the populations' establishment (ie. around 2007-2010 when the conservation breeding programs were initiated). However, in the subsequent years, the growth rates have remained fairly close to stable value (=1).

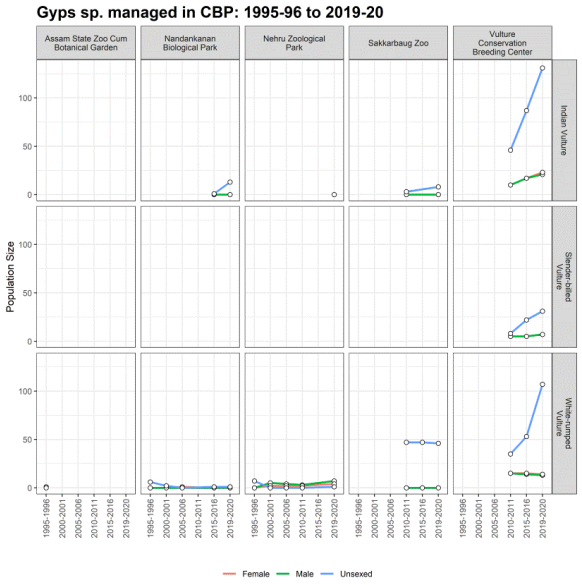


d) The holding patterns are indicative that majority of the individuals of all the three species are being housed only at Vulture Conservation & Breeding Centre, Pinjore (coordinating zoo) since the programs' inception. While Nehru Zoological Park, Nandankanan Biological Park and Sakkarbaug Zoological Park have housed the species, only the former two have managed to sporadically breed the species. Assam State Zoo & Botanical Gardens has not housed the species identified for conservation breeding till date.



e) The pedigree of the species indicates that the captive population is comprised only of F_0 (wild-origin individuals & founders) and F_1 (first generation captive-bred birds) [except one F_2 bird of *G. indicus*]. The captive population also comprises of a large number of wild-origin birds that have never bred and hence have high potential to serve as founder stock. The number unsexed birds are unusually high in the captive stock.





f) Based on the aforementioned points, the following <u>action points</u> were derived:

i. A reliable system has to be established wherein individual life history information is submitted by coordinating and participating zoos to the Central Zoo Authority to enable timely updation of National Studbooks of the species (an assigned function to the CZA in the Wild Life (Protection) Act, 1972). This will further aid in formulating population management plans of the species.

ii. All the organisations involved in conservation of vultures (in situ & ex situ) should collaborate in the larger interest of the conservation of the species. This will enable alignment of activities by individual organisations.

iii. The framework of IUCN Guidelines for management of species for ex situ conservation and subsequently the IUCN-CPSG One Plan Approach should be effectively incorporated in the management of Vulture populations in captivity.

iv. With the participating zoos for Vulture conservation breeding, it shall be ensured that (i). capacity building and knowledge transfer on Vulture husbandry is regularly taken up, and, (ii). Creation/upgradation of facilities are taken up to accommodate the growing population.

v. The conservation breeding and management plan for Vulture species should be updated.

vi. The overall goal of the ongoing conservation breeding should align with 5-year National Action Plan for Vultures (2020-2025).

vii. Based on the holding pattern and housing facilities available (as on September 2021), the following plan for movement of Vultures from Coordinating to Participating zoos is proposed.

Availability of housing, current stock and Number of individuals that can be acquired/disposed at Vulture conservation breeding centre, Pinjore.								
Facility at VCBC, Pinjore	Number of enclosures	Unit capacity	Total capacity	*G. indicus*	*G. bengalensis*	*G. tenuirostris*	Current stock	Acquire (+)/Dispose (-)
Big Holding Aviary	1	12	12	0	0	19	19	-7
Colony Aviary	6	40	240	121	87	15	223	17
Display Aviary	2	4	8	8	3	2	13	-5
Green Aviary	1	8	8	13	10	3	26	-18
Hospital Aviary	4	--	--	1	0	0	1	0
Nursery Aviary	4	4	16	0	0	0	0	16
Prerelease aviary	1	20	20	0	0	0	0	20
Quarantine aviary	3	15	45	0	0	0	0	45
Recovery aviary	1	--	--	0	0	0	0	0
Holding aviary	8	4	32	30	19	5	54	-22
Breeding aviary	8	4	32	23	11	8	42	-10

Availability of housing, current stock and Number of individuals that can be acquired/disposed at participating zoos identified for conservation breeding of Vultures (*Gyps sp.*).									
Zoo name	Facility	No.of enclosures	Unit capacity	Total capacity	G. indicus	G. bengalensis	G. tenuirostris	Current stock	Acquire (+)/Dispose (-)
Assam state zoo cum botanical garden	None	0	0	0	0	0	0	0	0
Nandankanan Biological Park	Colony Aviary	1	40	40	12	0	0	12	28
Nandankanan Biological Park	Nursery Aviary	1	4	4	0	0	0	0	4
Nehru Zoological Park	Colony Aviary	1	40	40	0	11	0	11	29
Nehru Zoological Park	Nursery Aviary	1	4	4	0	0	0	0	4
Sakkarbaug Zoological Garden	Colony Aviary	2	40	80	7	45	0	52	28
Van Vihar National Park and Zoo	Colony Aviary	2	40	80	3	47	0	50	30
Van Vihar National Park and Zoo	Holding Aviary	1	4	4	2	1	0	3	1
Van Vihar National Park and Zoo	Hospital Aviary	1	--	--	0	0	0	0	0
Van Vihar National Park and Zoo	Nursery Aviary	2	4	8	3	2	0	5	3

Van Vihar National Park and Zoo	Quarantine aviary	2	15	30	0	0	0	0	30

General Recommendations:

- The states may be encouraged to look into set up of Vulture rescue centres to cater to injured and sick vultures either within the zoo premises or as a satellite facility.
- BNHS and the State Government of Assam may collaborate and plan the inclusion of the BNHS run centre at Assam as a satellite facility of Assam StateZoo cum Botanical Garden and the zoo propose the same in the revised Master Plan.
- Birds that are healthy but have passed their breeding age should be exchanged with zoos that have vultures in their animal collection plan for display purposes to generate awareness of the conservation story behind the species.
- Identification and monitoring of release sites for reintroduction of vultures should be done by the participating zoos and the area of release must fall within its distribution range.
- Vulture safe zones should be established and monitored around all the conservation breeding centres with the objective of subsequent reintroduction of the individuals in the wild.
- Breeding efforts should be extended to the Egyptian vulture *Neophron percnopterus* and the Red-headed vulture *Sarcogyps calvus.*

Annexure 1

Participants of the Technical Workshop to review the CZA coordinated vulture conservationbreeding programme were:

Sr. no.	Name	Affiliation
1	Mr. Jagdish Chander, IFS	PCCF and Chief Wildlife Warden, Haryana
2	Mr. Devender Dalai, IFS	Chief Wildlife Warden, Chandigarh
3	Dr Sonali Ghosh, IFS, DIG-HQ	Central Zoo Authority
4	Dr. Bivash Pandav, Director	Bombay Natural History Society
5	Dr. Vibhu Prakash, Deputy Director	Bombay Natural History Society
6	Mrs. Nikita V. Prakash, Scientist-C and Biologist	Bombay Natural History Society
7	Dr. Sanjeet Kumar, IFS, Deputy Director	Nandankanan Biological Park, Odisha
8	Dr. Rajesh Kumar Mohapatra, Biologist	Nandankanan Biological Park, Odisha
9	Dr. Rohan Shringarpure, Centre Manager	Vulture Conservation Breeding Centre Bhopal, BNHS
10	Dr. Sankar Sarma, Veterinarian	Assam State Zoo cum Botanical Garden,Assam
11	Mr. Sachin Ranade, Centre Manager	BNHS Vulture Conservation Breeding Centre, Rani, Assam
12	Dr. M.A Hakeem, Deputy Director	Nehru Zoological Park, Telangana
13	Mr. Sandeep Gaud, Biologist	Nehru Zoological Park, Telangana
14	Dr. Abhishek Kumar, IFS, Director	Sakkarbaug Zoological Park, Gujarat
15	Dr. R.F Kadivar, Veterinarian	Sakkarbaug Zoological Park, Gujarat
16	Mr. Soumya Sunder Chakraborty, Centre Manager	BNHS Vulture Conservation Breeding Centre, Raja Bhat Khawa, West Bengal
17	Dr. Manoj Kumar, Biologist	National Zoological Park, Delhi
18	Dr. Harshita Raghav, Veterinarian	National Zoological Park, Delhi
19	Dr Devender Kumar, Evaluation and Monitoring Officer	Central Zoo Authority
20	Dr. Gowri Mallapur, Veterinary Consultant	Central Zoo Authority
21	Mr. Lakshminarasimha R., Scientific Officer	Central Zoo Authority
22	Ms. Arundhati Mohanty, Senior Research Fellow	Central Zoo Authority

Annexure 2: Summary of the presentations by participating zoos

1. VCBC, Nandankanan Zoological Park, Odisha – R. K. Mohapatra, Ph.D., Biologist

The centre is in the botanical garden adjacent to the Nanadakanan Biological Park and was established in 2011-12.

Infrastructure

1. One colony aviary (101'X41'X23'),
2. two nursery aviaries (25'X19'X18'),
3. Two exhibits (29'x50'x24', 53'x60'x24),
4. Laboratory complex with CCTV monitoring
5. Incubation room

Vultures at the centre

4 species of vultures including 12 Long-billed vultures, 1 white-rumped vulture, 3 Cinereous vultures and 2 Himalayan Griffons. Breeding among the Long-billed vultures was observed for the first time in 2018-19 but without success. In the year 2019-20, 5 Long- billed eggs were laid of which one hatched successfully but failed to survive.

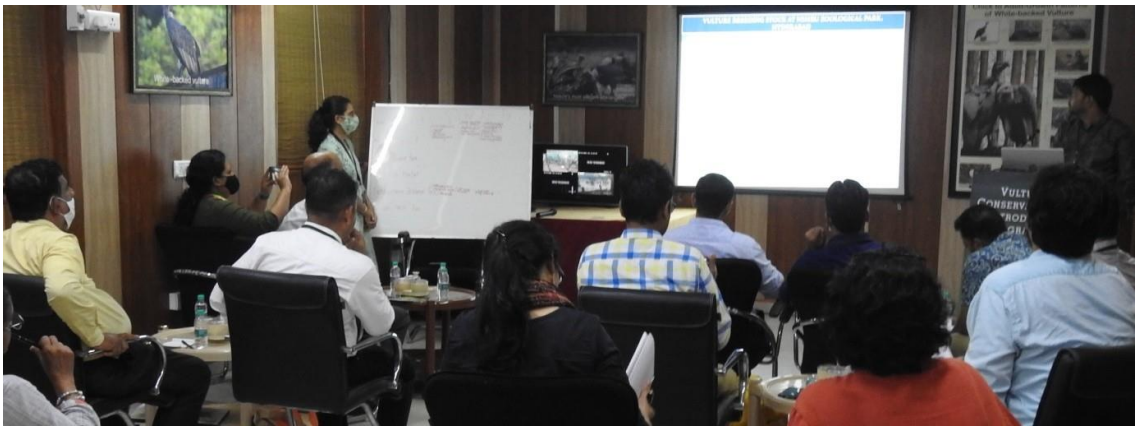
2. Sakkarbaug Zoological Park, Junagadh, Gujarat – Dr. Abhishek Kumar, IFS, Director

Centre is located within the zoo premises.

Vultures at the centre

The centre houses 5 species of vultures including 45 White-rumped vultures, 7 Long billed vultures, 1 Eurasian Griffon, 1 Himalayan Griffon and 1 King vulture. Successful breeding was recorded in 2012 for the first time when 1 chick of a White-rumped vulture hatched and fledged successfully. Till date a total of 18 White-rumped vulture nestlings from 59 eggs have fledged successfully with a maximum of 5 chicks hatched in the year 2017.

3. VCBC, Nehru Zoological Park, Hyderabad, Telangana – Mr. Sandeep Goud, Biologist



The Vulture breeding centre is located within the Nehru Zoological Park. It was established on 22.11.2010 with financial assistance from CZA. A biologist and a vulture keeper for the centre have been appointed by the Forest Department.

Infrastructure

The centre has 1 colony aviary equipped with CCTV Camera, 2 Quarantine aviaries and aCCTV monitoring room.

Vultures at the centre

The centre houses 11 White-rumped vultures of which 2 males and 3 females are of 20-25 years and were acquired in 2011 from Kanpur Zoo. A flock of 6 White-rumped vultures wereacquired from Sakkarbaug Zoo in 2014. These were subsequently sexed by LaCONES and found to be 5 males and 1 female. Breeding was first observed in 2012 and the first chick hatched in 2013 after 53 days of incubation. The chick failed to survive. Over the years, 3 nestlings hatched but all failed tosurvive.

4. VCBC, Bhopal, Madhya Pradesh – Rohan Shringarpure, Ph. D., Centre Manager

VCBC Bhopal was set up in 2013 by the Central Zoo Authority based on the recommendation of theVulture Recovery Plan, 2004. Funds for the construction of various aviaries and the management building were provided by the Central Zoo Authority while recurring costs ofthe centre are borne by the M.P. Forest Department through Director, Van Vihar NationalPark-Zoo. Administrative support to the centre is provided by the M.P. State Forest Department and Van Vihar National Park-Zoo. The Bombay Natural History Society looksafter the day-to-day management of the centre.

Infrastructure

There are 2 Quarantine aviaries, 2 Colony aviaries, 4 Holding aviaries, a CCTV camera Monitor room, and a Laboratory.

Vultures at the centre

The centre houses a total of 58 vultures of 2 species including 39 Long-billed vultures and 19 White-rumped vultures. The first flock of 6 juvenile Long-billed vulture was brought to the centre from Tamia, Chhindwara district in April 2014. During the same month, 15 vultures (9 Long-billed and 6 White-rumped) were brought from VCBC Pinjore. Subsequently, a flock of 20 more vultures were handed over by the then Forest Minister, honourable Mr. Prakash Javadekar to VCBC, Bhopalfrom VCBC, Pinjore. A total of 15 nestlings have hatched and fledged 5 White-rumped vultures and 10 Long-billed vultures.

5. VCBC, Rajabhatkhawa, West Bengal – Mr. Soumya Sunder Chakraborty, CentreManager

The centre is in Raja bhat khawa - a forest village outside the Buxa National Park, Alipurduar district, on the border of Assam and Bhutan. It was established in 2005 on 5 acres of West Bengal Forest Department land.

Infrastructure

The centre has 2 Quarantine aviaries, 4 Colony aviaries, 5 Breeding aviaries and1 Hospital, Display aviary, a CCTV and staff room, an Artificial incubation facility and a Laboratory cum office. Energized fence to prevent entry of wild and stray animals.

The centre also has a walk-in freezer of 10 x 10 x 8' and an anteroom 6 x 6 x 8' to store meat at -16°Cto -20°C. It works on three phase electricity, stabilizers and back up with Generator.

Vultures at the centre

The centre houses 3 species of vultures of a total of 142 including 92 White-rumped vultures, 18 Long-billed vultures and 32 Slender-billed vultures. Till date, 86 nestlings have hatched at the centre.

6. VCBC Rani, Assam – Mr. Sachin Ranade, Centre Manager

The Vulture Conservation Breeding Centre is located near the Belguri village at Rani Block, Assam. The vulture Conservation Breeding Center was established in 2007 at Rani, Kamrup district, Assam.

Infrastructure

The centre has 2 colony aviaries, 3 holding avaries, 1 green aviary and a quarantine facility 5 kms away.

Vultures at the centre

The centre houses 124 vultures of two species including 84 White-rumped and 40 Slender- billed vultures. Till date, a total of 62 nestlings including 45 White-rumped vultures and 17 Slender-billed vultures have hatched in captivity.

7. VCBC Pinjore, Haryana – Vibhu Prakash, Ph. D., Deputy Director, BNHS

VCBC Pinjore is in Pinjore, Haryana, 20 kms north of Chandigarh at the base ofShivalik hills.

Infrastructure

The centre has 6 Colony aviaries, 7 Holding aviaries, 8 Breeding aviaries, 8 Nursery aviaries,2 Green aviaries, 2 display aviaries, 4 Hospital aviaries, 1 release aviary, an interpretation centre and a quarantine facility 5 km away on Haryana Forest Department land. The centre has a well-equipped Hematology, Microbiology and a Molecular lab. A full-fledged Incubation and brooder facility

Vultures at the centre

A total of 378 vutlures of 3 species including 130 White-rumped vultures, 196 long-billedvultures and 52 Slender-billed vultures are housed at the centre.

The centre has hatched a total of 329 vultures in captivity including 120 White-rumped vultures, 170 Long-billed vultures and 39 Slender-billed vultures.

Additional Information

Vulture Conservation-Essential Links between in-situ and ex-situ initiatives

Dr. K. Shivakumar of Wildlife Institute of India provided his presentation of Vulture Conservation-Essential Links between initiatives for inclusion in the report

The National Wildlife Action Plan 2017-31 emphasised the importance to link ex-situ and in-situ conservation measuresto recover endangered species in India.

Vultures' population and habitats will be monitored under pan India assessment and monitoring of endangered species covered under the ' Integrated Development of Wildlife Habitats' (IDWH) scheme of MoEF&CC, Government of India.

Expected outputs of Vulture Monitoring Project of IDWH

1. Status of vultures and their habitats in India
2. Mapping of Vulture Safe Zones in India for reintroduction of captive-bred vultures
3. Database on habitat requirements and movement patterns of vultures in HP & MP
4. A long-term conservation plan for critically endangered vultures in India.

Integration of In-Situ and Ex-Situ Conservation Programmes

Zoos as conservation organization, have long been involved in partnerships to work towardbiodiversity conservation in India. Indian Zoos have high potential to contribute to in-situ conservation by strengthening its ex-situ conservation planning Globally, roughly one out of seven known threatened species on the planet can be found ina zoo or an aquarium and captive breeding in such institutions may be the only practical conservation option left for some species whose habitats are dwindling.

CZA has identified 73 Endangered Species that can be recovered by integrating both in-situand ex-situ conservation measures.

Vultures – (Pinjore and 6 Zoos in India)

Conclusions

• Facilitate a One Plan Approach for the integration of ex-situ and in-situ conservationaction,

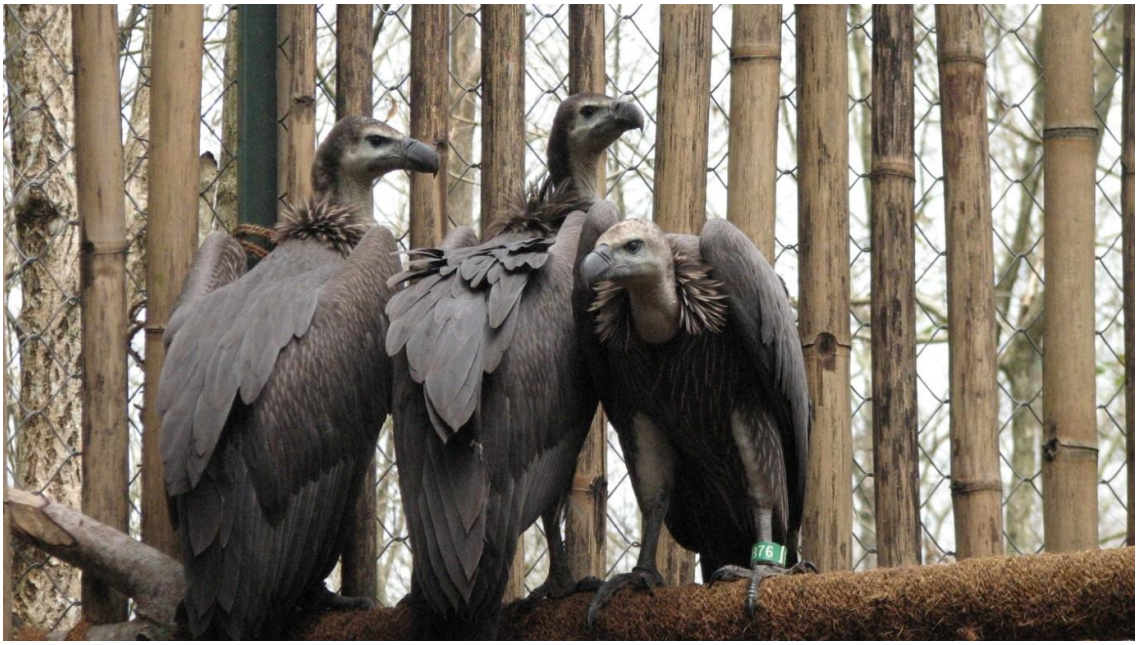
• Provide each individual animal with one record from the time of its birth to its death,

• Provide individual or group records on husbandry, behavior, reproduction, health, methodologies, feeding, training, transfers, and mortality that would be available to boththe ex-situ and in-situ communities for collaborative conservation action,

• Facilitate genetic management of populations and meta-populations,

• Offer a database for pooled information to generate physiological normal values, identifylife stage and reproductive attributes and act as a bio-surveillance mechanism for disease,

• Provide data on life history and health for PVA analysis using Vortex or for more complexanalyses using Meta Model Manager.



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