ex-situ UPDATES

A QUARTERLY NEWSLETTER OF THE CENTRAL ZOO AUTHORITY

Central Zoo Authority
केन्द्रीय चिड़ियाघर अधिकरण

Ministry of Environment, Forest and Climate Change

PREPAREDNESS FOR PANDEMICS

ACHIEVEMENT
ISO 9001:2015

SPOTLIGHT
SARDAR PATEL ZOOLOGICAL PARK

TRIBUTE
RAM BRAHMA SANYAL

DOUBLE EDITION

REINTRODUCTION

WILDLIFE WEEK CELEBRATION 2020

MAHENDRA CHAUDHARY ZOOLOGICAL PARK, CHHATBIR | WELLINGTON ZOO, NEW ZEALAND

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On the Cover:
Mouse Deer Re-introduction
Nehru Zoological Park, Hyderabad, Telengana
(Photo: Sara, Estudios)

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With HMEFCC Shri Prakash Javadekar, DGF&SS Shri Sanjay Kumar, ADG(WL) Shri Soumitra Dasgupta and DIGF - CZA Dr. Sonali Ghosh during the release of MEE.

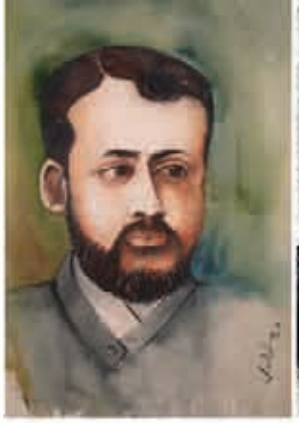
from the desk of **MEMBER SECRETARY**

We have had a challenging year with the outbreak of Avian influenza and then the closure of most of the zoos during the second wave of Covid-19 pandemic. However, this was also a time when CZA and Zoos decided to 'reinvent' to face the pandemic challenges. We are grateful to Shri Prakash Javadekar, Hon'ble Minister of Environment Forests and Climate Change to endorse the RoAR (Respect and Revive) human-animal relationship campaign and feliciate the CZA Prani Mitra Awardees during the 66th Wildlife Week.

We also collaborated with TERI (the Energy Resource Institute) to carry out special outreach events that attracted more than 253 schools from 25 states, and more than 2300 online entries for the online painting and poem writing competitions. We bring you glimpses of these and many other outreach and capacity building activities conducted at the national level. We also bring to you some success stories of conservation breeding and rewilding of endangered species in this double edition, that are both informative and also authored by conservation pioneers in their respective fields.

The zoos have also continued with their 'People's Connect' by reinventing their activities and strategies. Virtual live tours of zoos have been popular, so have been the development of online ticketing to mobile apps and contactless visits with covid appropriate behaviour followed by the visitors. In several states, initiatives have been taken to vaccinate zoo staff as part of the frontline. We have geared up for all eventualities, it is now hoped that zoos continue to provide the 'healing touch' and earn their well deserved place in people's hearts.

Dr. S. P. Yadav
Member Secretary
Central Zoo Authority



A portrait (Credits: Anukul Barman)

Source: Alipore zoo

TRIBUTE

RAM BRAMHA SANYAL

(1851 - 13th October 1908)

Pioneer of captive breeding in Zoos

Text: Sanjit Kumar Saha, WBFS
Divisional Forest Officer, Coochbehar Division, West Bengal

"Tigers that were brought up in captivity were generally milder in disposition and were sometimes tame enough to allow the keepers and others to handle them, but their temper can never be trusted".

A Handbook of the Management of Animals in Captivity in Lower Bengal, 1892

Like most hardworking, rural young men of his time, Ram Brahma Sanyal wanted to take up the respectable profession of becoming a doctor. Hailing from a small village Mahula in Murshidabad District of then undivided Bengal, the young boy dreamt big, fascinated by the animal beings around him. Living alongside the Gangetic plains, one of the most ecologically diverse and fertile landscapes, his interest in zoology blossomed. After schooling from Berhampore, Murshidabad he joined the Calcutta Medical College. But, poor eyesight hindered his dream to become a good doctor paved the way for him to become the first Superintendent of the famous Alipore Zoological Garden, Kolkata. He was also one of the longest-serving superintendents of the zoo from 1880 to 1906.

It was his keen observation of animals that set him apart. If an animal died, he would assist the veterinarian in its postmortem and send a report to the committee. He always kept silver nitrate solution, carbolic acid, caustic soda, chalk powder, etc. in his hand and used them to treat the animals if necessary. He also researched snake venom in the specially created zoo laboratory with the sole intention to find a reliable cure to snake bites.

His observations and notes came in handy for his seminal work " Handbook of Management of Animals in Captivity in Lower Bengal" as well as several other scientific articles that he contributed to the Proceedings of the Zoological Society of London and the Proceedings of the Asiatic Society of Bengal. The handbook was published in 1892 and has detailed animal husbandry notes on 241 species of mammals and 402 species of birds from across the globe. This publication was lauded in the 'Nature' journal thereby putting the Alipore zoo on the world map. He was also a keen botanist and his second book, "Hours with Nature", was published in 1898 where he discussed the rivers, forests, ponds, zoos, museums, and botanical gardens of the country.

In 1889, the captive breeding of Sumatran Rhino (*Rhinoceros sumatrensis*) and the birth of a calf took place at the zoo. This established him as a pioneer of captive breeding of wild animals in India. His acumen can only be judged from the fact that the next recorded instance of Sumatran rhino breeding in captivity happened only after 110 years in Cincinnati Zoo. Rai Bahadur Ram Brahma Sanyal continues to live in our memories through his writings and his love for the wild animals.

Conservation Breeding Programmes & Re-introduction

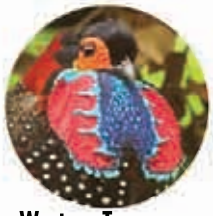
Red Panda

Padmaja Naidu Himalayan Zoological Park

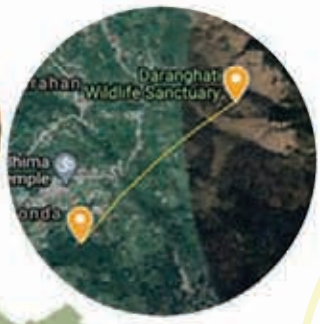
Singalila National Park
Neora Valley National Park

Padmaja Naidu Himalayan Zoological Park, Darjeeling

West Bengal



Western Tragopan



Sarahan Phesantry - Daranghati Wildlife Sanctuary

Sarahan Phesantry

Chail Phesantry

Chail Phesantry - Darbhog Village

Cheer Pheasant

Himachal Pradesh

Vulture Conservation Breeding Centre, Pinjore

Himalayan Griffon

White-backed Vulture

Haryana

National Chambal Santuary, Kanpur, Uttar Pradesh

Madras Crocodile Bank Trust, Mamallapuram

Nehru Zoological Park

Kinnerasani Wildlife Sanctuary
Pocharam Wildlife Sanctuary
Amrabad Tiger Reserve

Nehru Zoological Park, Hyderbad

Mouse Deer

Telangana

National Chambal Santuary, Kanpur, Uttar Pradesh

Red-crowned Roofed Turtle

Tamil Nadu

Wildlife Week 2020

RoaR

Respect and Revive

Exploring Human –Animal Relationships

Background

This planet houses countless species of living beings, fauna, and flora with complex interactions and linkages. Nature is a great provider, however, a growing utilitarian way of life and the pressures of anthropocentric development put undeniable pressures on the natural system. It is of vital importance for every human being to be aware of the responsibility of preservation of nature. For that reason, the social function of a zoological garden or a related institution is to a high degree defined by its education, outreach work. In India, there are more than 152 recognized zoos with an annual visitation of over 80 million.

Zoos are living institutions, living classrooms, living landscapes and could serve as a platform for educating people about the protection of habitat, ecosystems, and forests, and maintaining life-supporting processes of nature. Creating awareness about nature and natural resources and supporting a clear understanding of the interconnectedness of life on earth, is the best way to equip today's youth with the knowledge and leadership skills to meet tomorrow's environmental challenges.

The Covid 19 pandemic has created a paradigm shift in the way we look at the world around us. There is no better time to re-organize priorities and move forward towards participatory and inclusive management with governments, civil society, private sector stakeholders, and individuals adding their voices to take action to help conserve wildlife.

As a prelude to WLW 2020, a nationwide announcement was made inviting students of different age groups: Class 3-5 (8-10 years), and Class 6-8 (11-13 years). to participate in poetry writing and painting competitions.
Competition themes were

'My Favorite Animal (मेरा प्रयि वन्यजीव)', and 'All Wild Animals are My Friends (जंगल शहर में गूंज है, वन्यजीव हमारे दोस्त है).

Students from various parts of India submitted recorded questions on issues related to the environment and the cultural significance and relationship with wild animals to be answered by the Hon'ble Minister for Environment, Forest, and Climate Change, Shri. Prakash Javadekar.

Some of the questions were;

• *Heavy loss to wildlife is caused by massive floods in Assam. How can children become ambassadors to promote empathy and concern for wildlife conservation in these trying times?*

• *What role can children play in spreading a message of love for wildlife (particularly snakes) through festivals like Nag Panchami?*

• *Due to Corona we limit our outdoor activities. How can we continue to enjoy nature around us and motivate our friends too?*

Launch of Wildlife Week 2020

An official virtual launch was held on 5th October 2020, presided over by Shri. Prakash Javadekar, Hon'ble Minister for Environment, Forest and Climate Change. Shri. Prakash Javadekar, Hon'ble Minister, MoEF & CC responded to the questions posed by students (Youth Voice) and encouraged them to stay positive, enjoy nature while motivating their friends in these challenging Corona times. He further spoke about how they can become ambassadors for spreading a message of wildlife conservation.

Online talks and interactions on diverse subjects ranging from Ex-situ and In-situ Conservation Linkages, use of innovative art forms, and story-telling for inspiring youth to understand the current social and environmental issues re conducted virtually on CZA's Youtube Channel on 6th and 7th October for students across the country.

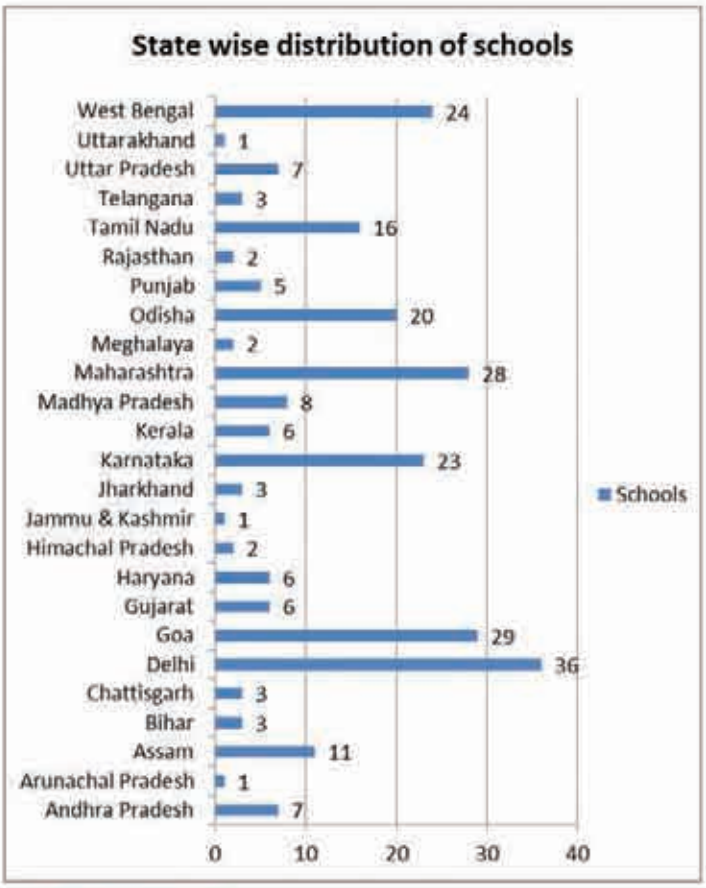
Celebration in Indian zoos

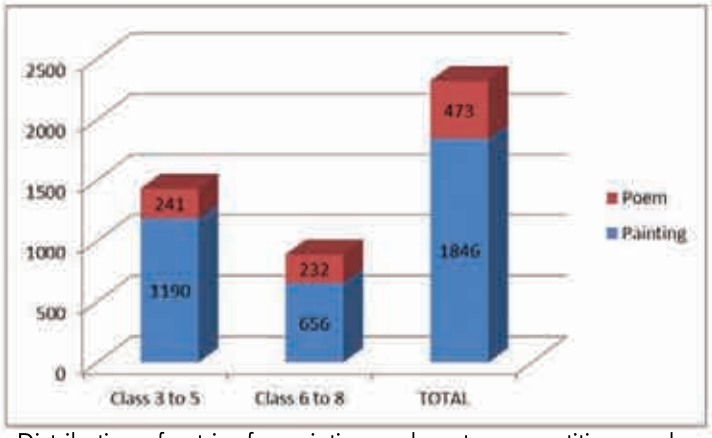
The noticeable pause that the pandemic put on people's lives notwithstanding, the zoo community came together virtually and adopted the CZA- Roar Campaign and forwarded the message of Respect (Nature) and Revive (our deep connection with the animals). Zoos across the country took up activities such as talks by subject matter specialists, mobile photography contests, Mehendi, face painting, palm painting contests to name a few.

Outreach and Impact

The online painting, poetry, and competition organized by TERI received an overwhelming response of 2300 online entries (1846 paintings and 473 poems) from children under the following categories:
Class 3 to 5: Painting – 1190 and Poetry – 241 entries
Class 6 to 8: Painting – 656 and Poetry – 232 entries

Wildlife Week, as always, is an opportunity not only to celebrate India's rich wildlife but also to bring people together to voice the message of conservation loud and clear!





Distribution of entries for painting and poetry competitions under RoAR campaign

Poetry Competition

Junior Category (Class 3 to 5)

Name: Nitya Srivalli G
Class: V
School: Little Angel School
State: Visakhapatnam, Andhra Pradesh

Name: Gurtejveer Singh Virdi
Class: IV
School: Sheth Karamshi Kanji English School
State: Mumbai Sub Urban, Maharashtra

Name: Madhureema
Class: III
School: Delhi Public School, Vasant Kunj
State: New Delhi

1 2 3

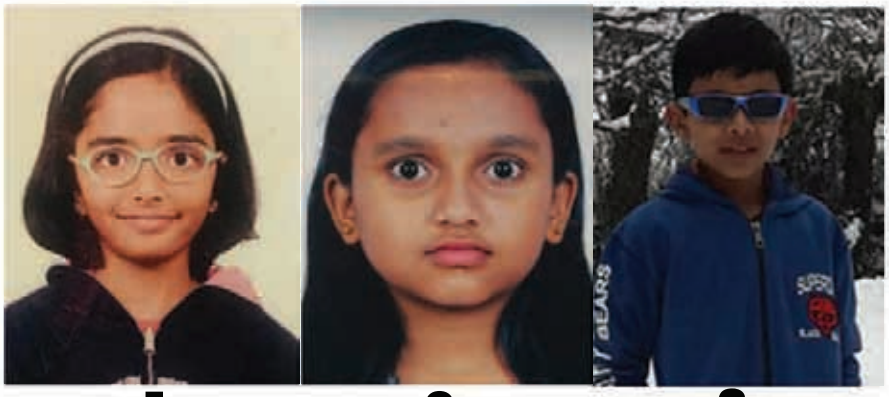
Poetry Competition

Senior Category (Class 6 to 8)

Name: Ashita M
Class: VII
School: National Public School Yelahanka
State: Bengaluru, Karnataka

Name: Sanjitha Shibu
Class: VII
School: National Public School, Yelahanka
State: Bengaluru, Karnataka

Name: Yash Aggarwal
Class: VI
School: Bosco Public School
State: New Delhi



1 2 3

Painting Competition

Junior Category (Class 3 to 5)

Name: Dibyanshi Guru
Class: V
School: St Joseph Convent Higher Secondary School
State: Sambalpur, Odisha.

Name: Farhan Karim
Class: V
School: Maria's Public School, Kamrup district
State: Assam

Name: Shreyashree Choudhury
Class: V
School: Maria's Public School, Kamrup district
State: Assam

1 2 3

Painting Competition

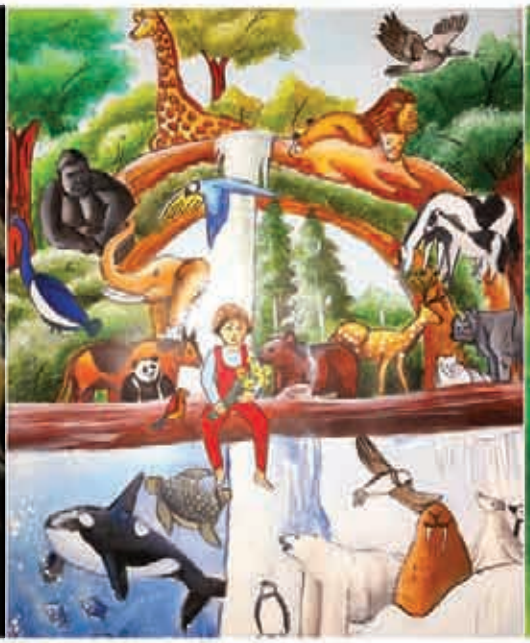
Senior Category (Class 6 to 8)

Name: Aisha Panda
Class: VIII
School: Buxi Jagabandhu English medium School
State: Bhubaneswar, Odisha

Name: Rakesh Kumar Prusty
Class: VIII
School: Vikash First Step, Sambalpur
State: Odisha

Name: Pratyusha Bera
Class: VIII
School: Vivekananda Mission School
State: Kolkata, West Bengal

1 2 3



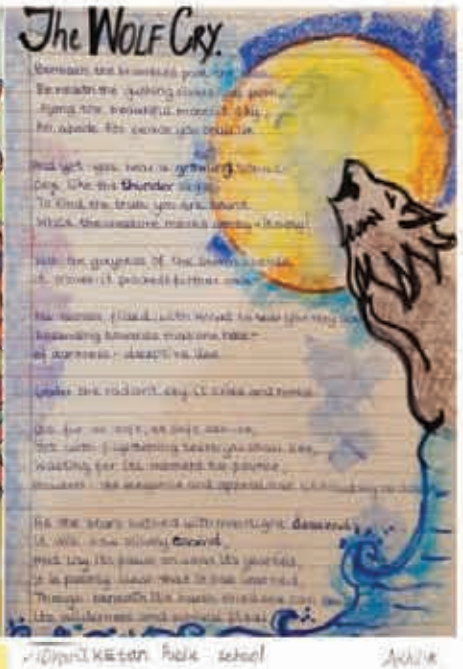
Owls come out at night
They like the height
They eat frogs, fish, rats, mice
I think they are pretty nice
They can turn their head around
Hunting at night with making sound
Their wing can span as big as kite
And they have a great night with their sight
It's the daytime now the Sun
And now we adieu

Owls by
Nitta Sevalli. G

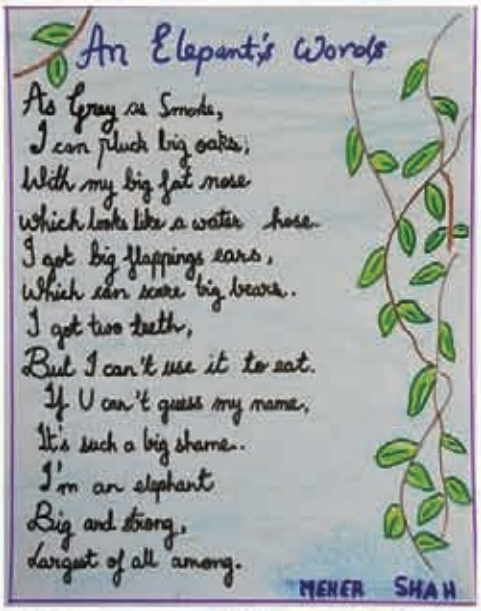
We Roar for All Wild Animals
As Our Friends

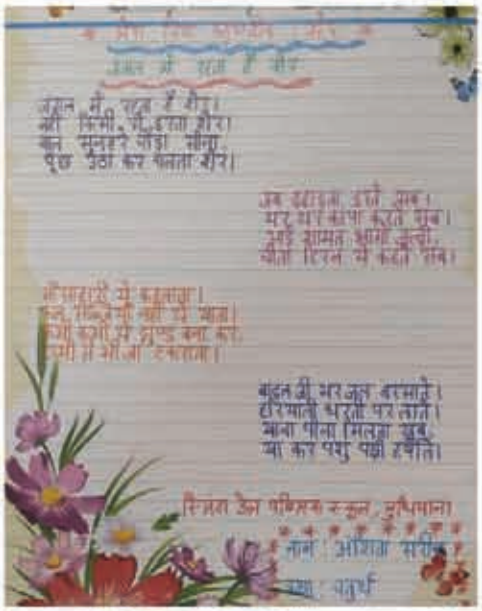
Killing animals for human selfishness, needs immediate amends
Let's stop doing this to our best friends
Animals are important for us in many ways
And guess what, I'm not the only one who so says!
They provide us with food
Their companionship keeps us in a good mood
They help plants pollinate, and disperse seeds
They help farmers, by getting rid of unwanted pests and weeds
So let's be kind to animals, be swift and evenly mute
And if they could they definitely would shower us with their smiles
Their sounds we must close
To ensure that they don't go extinct, we become aware
We must fight for their cause
But in an effort, without any pause
So let's get together, and work for the rights of our animal friends
It is upon our efforts, that their lives depend!

-Sanjitha S
VIII 'A'



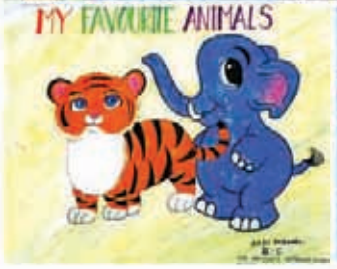
The WOLF CRY.





We roar for all
Wild animals
as our friends.

Dear beloved Animals,
I know we haven't talked.
but, I wanna give you these lines.
to tell how adorable you all are.
Whenever I try to talk,
I find it hard to catch my breath.
my heartbeats so loud,
when you're all infront of me.
I held my love for so long,
and I think it's time to let it out.
So, I'll treasure that to look,
for the rest of my life.



Wildlife Week 2020

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A caretaker disinfects the ducks' enclosure as a precaution against Bird Flu at a zoo in Jaipur on Jan. 11. Photographer: Himanshu Vyas/Hindustan Times/Getty

Preparedness for Pandemics

AVIAN INFLUENZA OUTBREAK 2020-21

Avian influenza (AI) is an infectious disease caused by Avian (bird) Influenza (flu) Type-A viruses. These viruses are naturally found in wild bird populations, specifically in birds with affinities to aquatic habitats. The viruses can also infect domestic poultry and other bird and animal species. An outbreak of AI swept through India in early 2021. This outbreak involving the H5N1 and H5N8 viral strains was important because of the significant involvement and mortality of wild birds. AI occurs worldwide, and different strains are more prevalent in certain areas of the world than others.

Considering the critical need for proactive monitoring, in this case, the Central Zoo Authority issued advisories to all the zoos in compliance with the National Action Plan for "Prevention Control and Containment of Avian Influenza". The advisories were targeted towards preventing ingress of avian Influenza with precautionary measures to be implemented within the zoo and monitoring of interface areas like wetlands visited by wild waterfowl within the campus.

The AI outbreak in poultry and wild birds spanned 14 Indian states/union territories from Jammu and Kashmir in the north to Kerala in the south. Zoos across the country implemented strict measures for monitoring with regular testing of any birds with clinical symptoms and sending birds for post-mortem to designated laboratories. Zoos submitted daily monitoring reports till March 2021.

Positive cases were reported from only 3 zoos in India in January 2021. With strict monitoring for all diseases and biosecurity measures for clinical case interventions, no further cases in zoos have been reported.

SARS-COV-2 second wave 2021

The current COVID-19 global pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has highlighted the growing need for disease surveillance for emerging zoonotic disease and potential spillover events. Last year, in March 2020, Bronx Zoo reported the presence of SARS CoV2 in felids at the zoo. A webinar with international disease and zoo experts was organized by CZA to provide first-hand information on measures to be taken for zoo animals.

This year, in May 2021, lions in three zoos in India tested positive for the SARS-CoV2 virus. Timely advisories, expert veterinary and technical support from IVRI and CCMB-LaCONES helped alert zoos. Detailed sample collection protocols were put together along with instructions on precautions to be followed for continued monitoring of animals in the zoos was circulated by the Central Zoo Authority. In the end it is good news that all the animals that were treated are faring well. As next steps, CZA is planning to take up initiatives in One Health surveillance, and management strategies to mitigate the effects of potential panzootic viruses.

Achievement

Setting International Standards

Nehru Zoological Park, Hyderabad

ISO 9001:2015 Certification

Text & Photos:
Dr Sidhanand Kukrety, IFS , Director, NZP
Ms. N. Kshitija, IFS, Curator, NZP

Grand entrance of the Nehru Zoological Park, Hyderabad

For the first time in the country, Nehru Zoological Park (NZP), Hyderabad has acquired ISO 9001:2015 Quality Management Standards Certification from ASCB, U.K., based on its standard working procedures.

HYM International Certifications Pvt Ltd, accredited by ASCB (UK) conducted the assessment of ISO 9001:2015 Certification, with team Members Sri T. Sundar Ramaiah (Rtd) Dist. Judge, Sri C. Madhu Babu, Auditor, and Sri Sivaiah Alapati, Managing Director, lifetime Membership QCI. The team conducted the audit on the standards being followed in NZP, Hyderabad particularly in areas of sanitization, food processing, conservation breeding, zoo hospital, animal care, hygiene maintenance, and establishment in a phased manner.

The working of the various sectors was also observed by the evaluators and they appreciated the efficiency, teamwork, and commitment of the staff that has raised the standards of the zoo.

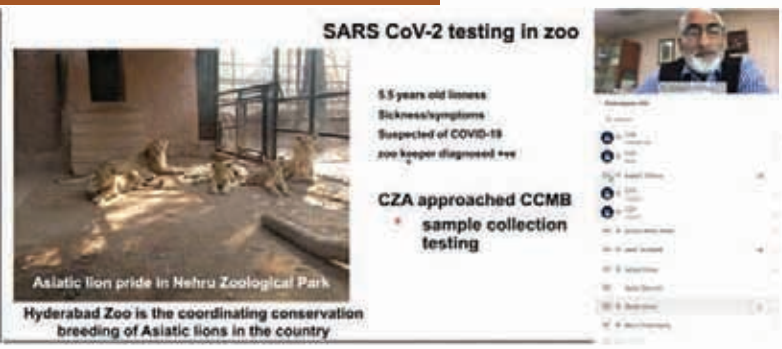
Transparency at all levels of activity, round-the-clock emergency response, and the standards being followed that meet the criteria for ISO certification led the evaluation team in conveying a strong recommendation for ISO certification for NZP, Hyderabad in December 2020.

News and Events

December 07, 2020

On December 07, 2020, the 37th Governing Body Meeting was chaired by the Hon'ble Minister of Environment, Forest, and Climate Change Shri. Prakash Javadekar. It was an important meeting as several important recommendations of the Expert Group of Zoo Design, Administrative Committee and the Technical Committee of CZA were approved by the GB. Among the new initiatives launched was the status update on the pilot project on vision planning to upgrade 15 Zoos in India to global standards which were highly appreciated. The recommendation to increase the extent of non-native species in Indian zoos from 10 to 25% and to set up a Centre for Excellence for Ex-situ conservation were the other key highlights.

December 10, 2020



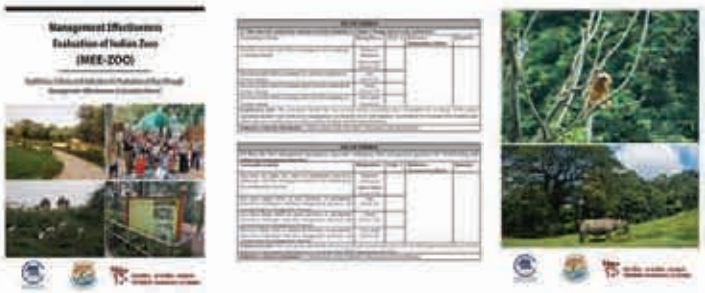
A meeting was held to review steps taken by zoos housing felid species as part of preventive action against zoonotic transmission of COVID-19. More than 70 Zoos participated in the meeting involving experts from Wildlife Institute of India, CSIR - Centre for Cellular and Molecular Biology, and ICAR-Indian Veterinary Research Institute.

Advisory for mandatory compliance of statutory provisions pertaining to Rights of Persons with Disabilities (Divyangjan) in Zoos.

Guidelines on stocking density of various crocodilian species in Indian zoos

January 11, 2021

The framework for "Management Effectiveness Evaluation of Indian Zoos (MEE-ZOO)" was released by the Hon'ble Minister of Environment, Forest, and Climate Change Shri. Prakash Javadekar in a special event in New Delhi. MEE-ZOO is an evidence-based, comprehensive, and independent exercise encouraging the maintenance of the highest standards in zoos across the country and adhering to core values of accountability, transparency, innovation, use of technology, collaboration, and integrity to achieve the mandate of conservation of endangered species. During the event, the Hon'ble Minister also announced awards for 5 best performing zoos under the MEE-ZOO evaluation which is a major boost to all the zoos in the country.



January 27 & 28, 2021

A two-day workshop for Zoos on "Management Effectiveness Evaluation of Indian Zoo (MEE-ZOO)" was held by CZA to sensitize and train the zoos on applying the MEE-ZOO framework. Shri P.C. Tyagi, IFS (retd) former PCCF & HoFF, Tamil Nadu presided over the sessions. A panel of eminent forest officers with experience in zoos and wildlife conservation have been requested to serve as external evaluators to the program ensuring complete transparency and unbiased assessment of the zoos.

29th Foundation Day of the Central Zoo Authority was celebrated on February 06, 2021

Central Zoo Authority on its 29th Foundation Day, encouraged the zoos to organize activities highlighting the **"Role of zoos in conservation of Bio-diversity"**.

The concept was envisioned by the Hon'ble Prime Minister of India, Shri Narendra Modi in his "Mann ki baat" programme, where he had urged to spread awareness through naming of trees in all campuses.

On this day, the zoos were also requested to implement Hon'ble Prime Minister of India Shri Narendra Modi's vision under 'Mann Ki Baat' wherein he reiterated to create awareness on local flora, trees, and plant life. Zoos actively took up activities to create awareness of native species by signboarding, creating nature trails and involving children in the outreach activities.

Capacity Building Programmes

February 09 - 12, 2021

East Zone - Zoo Keepers Training Programme

The programme was conducted by Kanan Pendari Zoological Garden, Bilaspur Chhattisgarh in a hybrid mode. The enthusiasm was palpable as several of the zookeepers including women keepers refreshed their knowledge skills in animal upkeep and management.

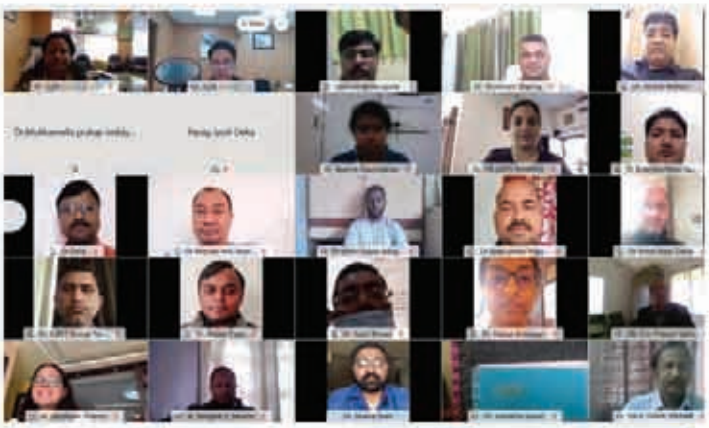
February 22 - 23, 2021

"Sensitization of Zoo Staff on Zoo Management" was held by Sri Chamarajendra Zoological Gardens, Mysuru. Around 44 participants from the Zoos 9 different zoos, under the Zoo Authority of Karnataka participated. Officials from the Central Zoo Authority were present virtually throughout the sessions.

February 14 - 18, 2021

West Zone - Animal Keeper Training Programme - A hybrid mode workshop was hosted by Kamla Nehru Zoological Garden, Kankaria, Ahmedabad for the west Indian zoos. More than 30 participants attended in person whereas some theoretical sessions were open to attendance from all across the country. The CZA officials delivered talks and had a virtual interaction with the participants.

February 23 - 25, 2021



An online refresher training (virtual mode) on Wildlife Health Management for Veterinary Health Professionals was conducted upon request from the Wildlife division of MoEFCC. The workshop content was aimed at participants from the Animal Husbandry (veterinary) department/State Forest Department and zoos. The workshop had 101 nominations from field veterinary offices across 27 states and 2 union territories. The three-day virtual training included theoretical sessions on wildlife and conservation issues (Biodiversity conservation challenges in India, biological, behavioral, ecological attributes of select species, wildlife conflict (challenges, identifying conflict individuals using wildlife forensics, options for management); legalities and procedures in addressing mortalities, capture and rescue and rehabilitation of wild animals; scientific data management, emerging wildlife diseases; general field procedure and exposure to wildlife forensics and introduction to One Health and the role of veterinarians in that paradigm. Teaching inputs were provided by experts from institutions like Wildlife Institute of India, Indian veterinary Research Institute, Centre for Cellular and Molecular Biology /Laboratory for Conservation of Endangered Species, Wildlife Crime Control Bureau, and NGOs GIZ, Wildlife Trust of India, Wildlife SOS, Pygmy Hog Conservation Program.

March 15 - 17, 2021

National Zoo Keepers Training on Captive Management of Reptiles at IGZP, Visakhapatnam was conducted by combining the west zone zoo keepers training program with specialized training in handling reptiles including snake rescue and snakebite management. The program was conducted in hybrid mode with participation from over 50 zoos. The key resource person for this hands-on training was Dr. Gowri Mallapur, Veterinary Consultant CZA. To further the digital mode of DIY training, short videos of theory and basic handling were pre-recorded and released as teaching aids. 10 such training videos that cover the entire gamut of crocodilians, snakes, turtles, and tortoises have been prepared and are available on the IGZP (Vizag zoo) youtube channel.

International women's day is a day celebrated annually worldwide on the 8th of March. It is a symbolic celebration initiated to recognize and honour women for their achievements in all fields of work. This celebration has garnered popularity since its commemoration by the United Nations in 1977.

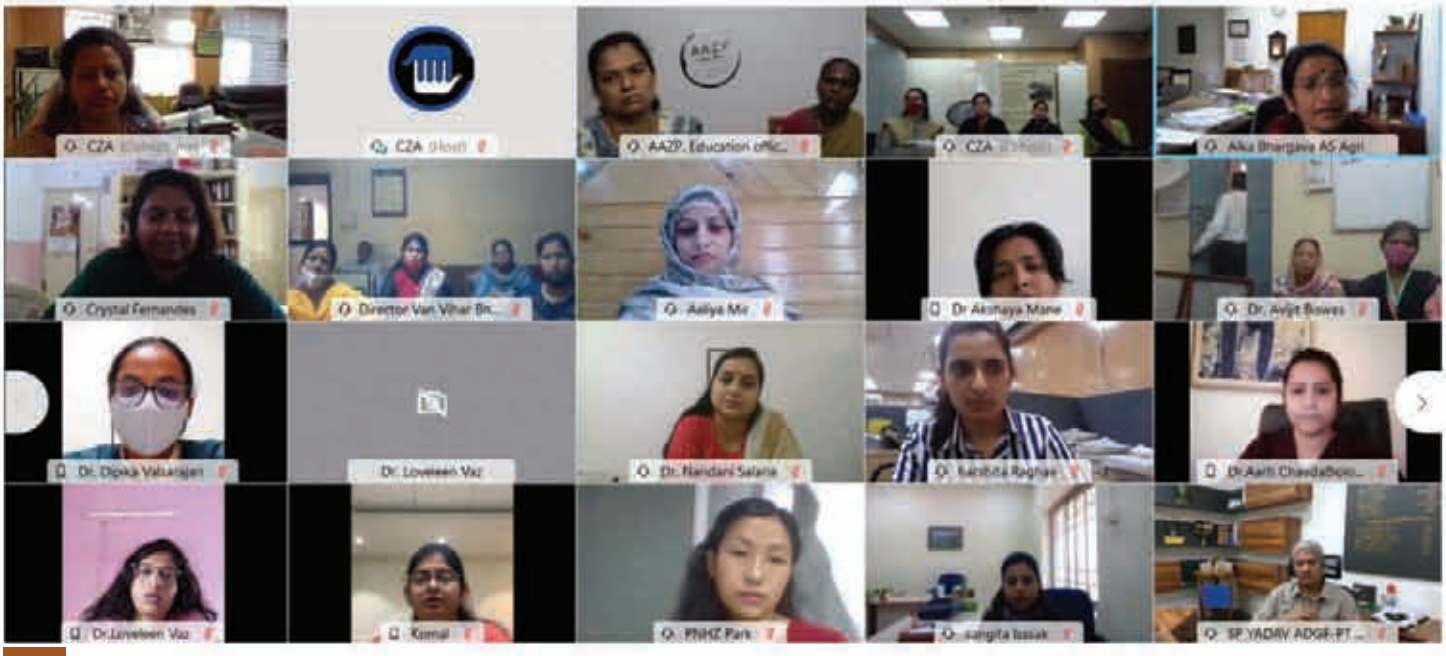
The theme for this year's celebration was "Women in leadership: Achieving an equal future in a COVID-19 world". And the campaign title was #ChooseToChallenge, stating that a "challenged world is an alert world and from challenge comes change".

Being mindful of the theme the Central Zoo Authority (CZA) organized an online webinar on the 8th of March 2021 to recognize and celebrate the efforts and achievements of women working on frontlines for animal welfare and management in zoos.

Representatives from the different cadres of service i.e., Directors, Curators, veterinarians, biologists, education officers and animal keepers were invited for the panel discussion.

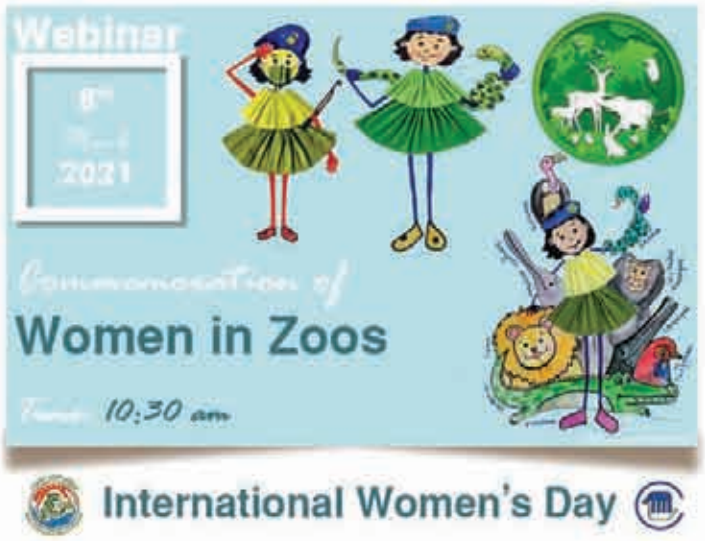
Celebration of Women's Day 2021

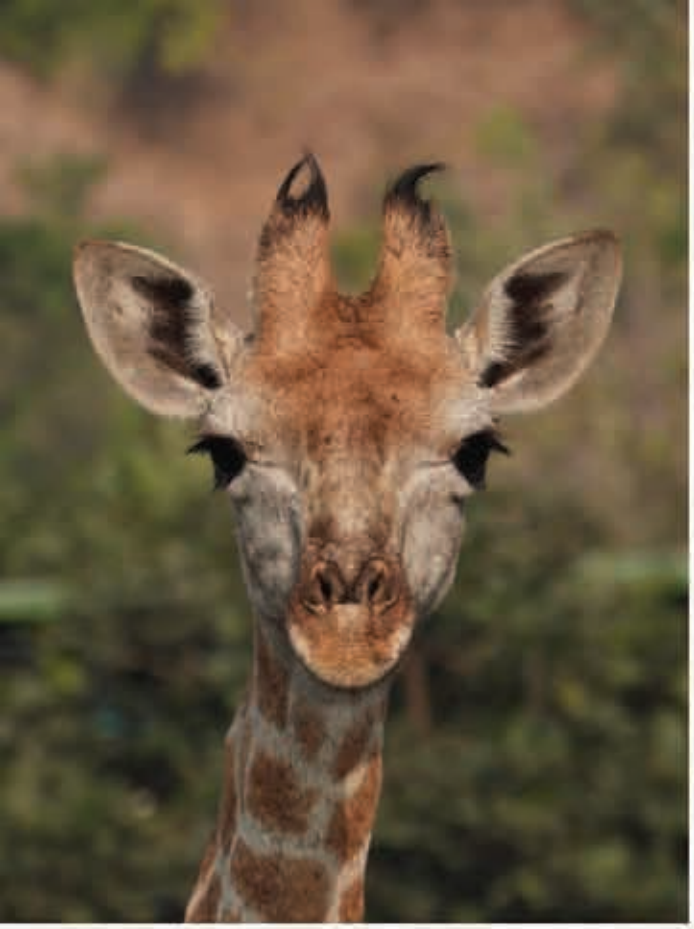
Compiled by Arundhati Mohanty, SRF Central Zoo Authority



The session began with a welcome address by Dr S.P. Yadav who highlighted the diverse roles that a woman fulfils effortlessly whilst being on the frontlines of the workforce. This paved the way for the panel discussion that was centred around the challenges faced in the management of zoos and animal welfare. The discussion focussed on how the panellists have coped with the changed global scenario vis-à-vis COVID-19 and in the welfare and management of animals, and the zoo. The panelists included women zoo directors, curators, veterinarians, biologists, educationists, and animal keepers who shared their own personal challenges and achievements.

In view of the discussion, Dr Alka Bhargava, Additional Secretary, Ministry of Agriculture and Farmers welfare gave a special address on 'Sustainability in zoos and its implications on conservation. She emphasized the need for knowledge sharing and cross-sectoral domain understanding to gain a holistic overview that would aid in the formulation of a circular economy within the purview of zoos. The webinar brought together women serving across the 152 zoos on one platform to highlight their dedication and celebrate their achievements. Several other zoos such as National Zoological Park, Delhi organised a webinar with former and present women directors in zoos. Arignar Anna Zoological Park Vandalur acknowledged and felicitated all verticals of women working in the zoo. It is expected that small gestures such as these shall help motivate young women to venture into the field of ex-situ conservation.





Spotlight

Sardar Patel Zoological Park, Gujarat

Kevadia Jungle Safari

Text & Photos: Dr. Ram Ratan Nala IFS, Director, SPZP

Sardar Patel Zoological Park (popularly known as Kevadiya Jungle Safari) was inaugurated by Hon. Prime Minister of India Shri Narendra Modi on 30th October 2020. It is a state-of-art zoological park with a unique collection of native and non-native animals. The development of the Zoological Park was initiated in the month of May 2019 and was completed by October 2019 making it one of the fastest made Jungle Safari.

Located in a valley between the Satpuda and Vindhyachal ranges and on the banks of the Narmada River, the unique and undulating topography adds to the picturesque beauty of the Zoological Park. The zoo has been established at seven different altitude levels adding to the unique features of the Safari Park.

Kevadiya is rapidly emerging as an International Tourist Destination. As a part of the Integrated Kevadiya Tourism Development area, many projects have come up near the Statue of Unity, the tallest statue in the world. Sardar Patel Zoological Park popularly known as Kevadiya Jungle Safari has been developed near the Statue of Unity as a part of the same project.

Visitors to Sardar Patel Zoological Park can experience the different sections of the park on foot along the 5.5 Km circular kutcha roads and also in the Hop-on hop-off facility with free E-carts that run from one stop to the next. Both the sides of the roads have lush vegetation for the immersive experience. Self-explanatory signages at every enclosure along with directional signages make the zoo very visitor friendly.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Tourist guides are available for guiding the visitors at different locations of the zoo. The facility of shades and drinking water have been placed at regular intervals.

Among the major attractions are the two-state of-the-art architectural marvels, the GeoDesic Dome walk-through bird aviaries for native and non-native birds. The domes are designed to allow the birds' free flight and provide sufficient space to display their natural behaviors. The aviaries are further enriched with a variety of fruiting and flowering trees that allow for close replication of the bird habitats.

The aviaries for the aquatic birds have large water bodies with aquatic plants simulating their natural habitat. Suitable nest boxes and perches of different sizes have been placed at various locations to ensure that all the biological needs of the birds are fulfilled. Various types of enrichment, including sensory stimulation, are carried out in the aviaries for the well-being of the birds. The aviaries are popular among bird watchers.


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Besides the aviaries, the Sardar Patel Zoological Park has a diverse mammal collection; the Majestic Asiatic Lions, Tiger, and Leopard inhabit the section for carnivores. The carnivores are displayed in large naturalistic enclosures with features like water bodies and with a glass viewing area for visitors to enhance the visitor experience. The Greater One-Horned Rhinoceros and the Indian Gaur can be seen in the section for mega-herbivores.

Different species of deer and antelope; Chital, Sambar, Sangai, Barking Deer, Four-horned Antelopes, Blackbuck, Chinkara, and the Asiatic Wild Ass are housed in the herbivore section of the park.

Non-native species from across the globe housed in the zoo have enclosures that have been designed to simulate their natural habitats. Giraffe, Zebra, Ostrich, Wildebeest, and Oryx represent the African continent, Australia is represented by animals like the Wallaby and Emu. Primates like the Capuchins, Squirrel Monkeys, Marmosets, and Cotton-top Tamarins are very popular exhibits.

Fodder and fruit farms have been established for the in-house supply of organic food to the zoo animals. A team of experienced veterinary doctors along with biologists and Livestock inspectors are present on-site 24*7 and deal with all the regular health-care, upkeep and any medical emergencies.

The zoo along with other tourist destinations near the Statue of Unity has opened up opportunities for providing employment to the locals both directly and indirectly. Animals at the zoo are cared for by the locally recruited animal keepers from nearby villages of Kevadia, who are all now fondly referred to as a Mowgli among the villagers. All the animal keepers, after recruitment, were trained at Sakkarbaug Zoo and Indroda Biological Park. in all aspects of animal handling and animal care. The zookeepers have exceeded all expectations and are doing an exemplary job. The drivers, guides, ticket counter operators, security guards, livestock inspectors in the zoo are also mostly hired locally.

The Kevadiya Jungle Safari continues to further the dream of the Hon'ble Prime Minister of India for a self-reliant Nation that believes in itself and its people.

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Talking Heads

Mr. Bill Street,

Director, Global Center for Species Survival and Senior Vice president, Indianapolis Zoo, U.S.A.

"Indianapolis Zoo Now International Hub for Species Conservation Efforts—The Zoo partnered with the International Union for Conservation of Nature (IUCN) and Special Survival Commission (SSC) to establish the first Global Center for Species Survival. This new center will enhance the efforts of SSC wildlife experts worldwide working to save threatened species, transforming the Zoo's ability to make a difference in protecting the natural world. Zoo Advisors is pleased to be working with Rob on their new strategic plan."

Robert Shumaker, President/CEO

Can you elaborate the role that the Global center of species conservation will play in the global conservation scenario?

The Global Center for Species Survival is a partnership between the IUCN Species Survival Commission (SSC) and the Indianapolis Zoological Society. The Global Center team supports and works with the expert members of the IUCN Species Survival Commission who identify, evaluate and work to reverse the extinction threats facing all animals, plants and fungi, with the ultimate goal to increase impact across assessing, planning and implementing action for species conservation. The Global Center will increase the existing capacity of the SSC Network by seeking opportunities to strategize around the challenges that the SSC Specialist Groups encounter that slow conservation progress. The Global Center also pulls on the expertise of the zoological community by increasing the communications and "storytelling" to the public to inspire and engage them in actions that benefit wildlife and wild places.

How do you envisage bridging the gap between ex-situ and in-situ conservation through the Global center of species conservation?

The Global Center for Species Survival has the potential to marry both the benefits of ex-situ and in-situ conservation. I think it's brilliant to have a team of conservation coordinators focused on advancing in-situ conservation efforts embedded within what would be considered primarily an ex-situ conservation organization. Ex-situ conservation efforts provide emergency and often last resort assurances for some of the most critically endangered populations of plants, fungi and animals. They also provide opportunities to gain critical knowledge and experience in the needs and management of these species (and others like them) which can improve in-situ efforts. Many ex-situ scenarios, such as those provided at zoos and aquariums, provide opportunities to educate and engage the public in ways that can bring attention to in-situ conservation. It is also clear that there is a great deal of expertise within ex-situ organizations that can benefit in-situ conservation.

The Assess, Plan, Act model of the SSC is predicated on the ability to implement the conservation action plans, ideally under a One Plan Approach model which seeks to unite the complementary efforts of in-situ and ex-situ communities. Through this model, the Global Center will support and accelerate species conservation and the collaborations needed to achieve success.

What do you foresee as the possible challenges in this initiative?

The creation of the Global Center has been well received and I don't believe there are any roadblocks that can't be overcome with transparency and innovation. However, I believe our biggest challenge will be assessing the diverse needs of the Specialist Groups and prioritizing our work to have the greatest impact. The SSC is an incredibly large, dynamic, active and ever-changing network, and the Global Center will need to remain nimble to meet the ever-changing needs of this conservation community. There is so much that can and needs to be done that prioritization and focus will be critical. We also will need to consistently reflect on our responsibilities of serving a global community and be mindful of the cultural, socio-economic, governmental and other differences that comprise a global community. We will also need to identify opportunities to engage our next generation of conservation leaders and provide pathways to incorporate them in large numbers into international conservation efforts.

Do you have any target species amongst the different taxa that would be looked at the beginning? If yes, what was the basis for this choice?

We specifically aligned the Coordinator positions with how the SSC Specialist Groups are organized. One Coordinator concentrates on each of the following taxonomic groups: Invertebrates, Plants and Fungi, Mammals, Reptiles and Amphibians, and Birds. Two additional Coordinators focus on Marine and Freshwater species and issues where there will be some overlap with the taxonomic Coordinators. The species and issues the Global Center will prioritize will be informed by the SSC Chair's office and input from the Chairs and members of each of the Specialist Groups.

Species survival promulgation requires collaboration not just between scientists but also with the grassroot communities, how do you visualize this being abridged?

The Global Center will be adding a Behavior Change Coordinator position later in 2021 that will focus on the human dimensions of conservation. The approaches of this person will be on efforts to work with grassroots communities and the audiences that most directly affect species conservation and protection, and organize efforts and campaigns to change human behavior to benefit species. They will also need to have a deep understanding of the many cultural and social beliefs that influence human behavior. Many of the conservation action plans developed by the IUCN SSC's Conservation Planning Specialist Group have specific activities to adapt to human behavior, so this position will influence conservation science with social marketing efforts.

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Any conservation recommendations that you can suggest vis-à-vis Indian zoos based on your experience?

I strongly believe in the Assess, Plan and Act model of the SSC, and there are countless opportunities for Indian zoos to get involved in local, national and international conservation efforts regardless of their size and capacity. I believe all zoos have the expertise and capacity to get involved in Red List Assessments and assist in the staggering effort to assess the more than 8 million species on our planet. Some zoos have the capacity and expertise to provide support for the creation of conservation action plans, and of course zoos have been supporters of the implementation of these plans in-situ by providing financial support or the expertise of their staff. The Assess/Plan/Act model is strengthened by expanding the SSC network and improving our ability to effectively communicate and engage people in conservation which is one of the strengths of zoos. There are many ways that Indian zoos, regardless of their size, can have meaningful impacts on global conservation.

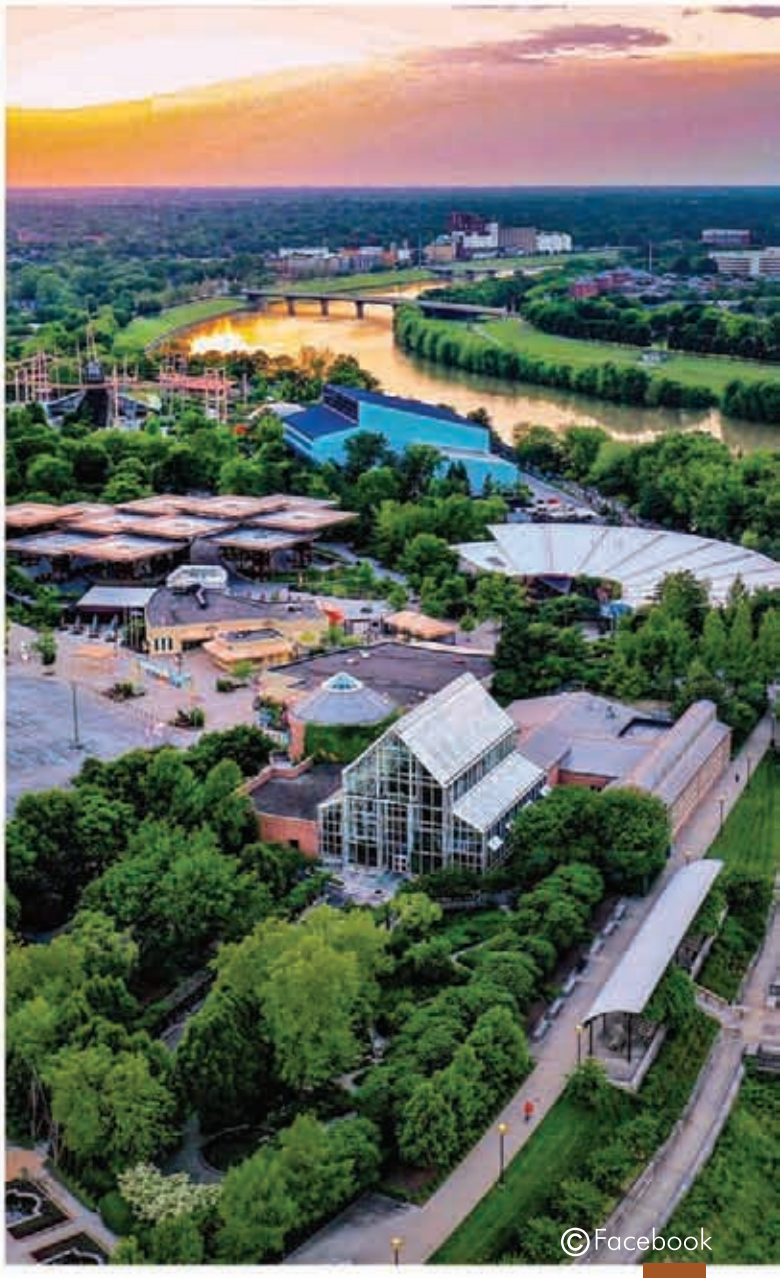
The IUCN SSC is also looking to establish National Species Specialist Groups in the near future and will be further building relationships with in-country experts, partners and Governments through these groups to focus more on national and local conservation priorities. The Global Center will work with the IUCN SSC and other partners including WAZA, to help connect leading zoos around the world to this effort, as part of a movement called Reverse the Red.

In the context of India, how can our zoos and the species in focus here benefit from the development of the Global center?

India has an impressive array of zoological institutions, many of which are connected to other zoos worldwide through the World Association of Zoos and Aquariums (WAZA). The Central Zoo Authority has made great strides in improving not only the quality and capacity of zoos throughout India, but has also facilitated zoos'

Would the Global Center for species survival be interested in collaborations with zoos in India and do you have any Indian species in focus?

Absolutely. India is an incredibly biologically diverse country, and there are many great conservationists living in India working on protecting species. Whether it be implementing plans for saving the Great Indian bustard, or participating in population assessments and threats of nesting sea turtles along the coast, or helping to celebrate the conservation success of efforts to protect the Greater One Horn Rhinoceros and many others, the Global Center intends to work globally to advance species conservation. The SSC includes several conservation leaders from India and they have already begun to help us prioritize how the Global Center can have a positive influence on species from the region.



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Species in focus

Indian Chevrotain

Text:
Dr A.J.T.Johnsingh, Nature Conservation Foundation, WWF-India and The Corbett Foundation.
Dr P.O. Nameer, Professor (Wildlife) & Dean, College of Climate Change and Environmental Science, Kerala Agricultural University, Thrissur.

Photos: Sara, Estudios

In January 1978, a forest guard in Mundanthurai Plateau, Tamil Nadu tried to save a male Indian chevrotain that ran in to the Servalar River in order to escape a domestic dog. As the guard caught hold of one of the hind legs of the swimming chevrotain, it turned around and inflicted a deep wound between the thumb and the index finger. The guard screamed in pain and let go of the deer, and returned to the shore with a bleeding hand. The chevrotain swam and reached the other shore safely. Late Dr. Salim Ali, Dr. Madhav Gadgil, late Mangalaraj Johnson, the Warden of the Sanctuary late Dr. Rauf Ali and 15 biologists who had come for basic training in wildlife research methods witnessed this. - Dr A.J.T. Johnsingh

Indian chevrotain (*Moschiola indica*), commonly known as the mouse deer, is one of the three species of chevrotains found in the Indian subcontinent. Indian chevrotain is endemic to peninsular India whereas the white-spotted chevrotain (*M. meminna*) and yellow-striped chevrotain (*M. kathygre*) are endemic to Sri Lanka. The chevrotains belong to an ancient mammalian lineage that was probably abundant and distributed worldwide during the Oligocene and Miocene, ca. 35 to 5 million years ago. This article borrows from the first detailed account ever written on the species by TR Shankar Raman of Nature Conservation Foundation.

Although the chevrotains belong to the suborder Ruminantia (ruminants), among the even-toed ungulates (Artiodactyls), they share many features linking them with the suborder Suina (suoids, including pigs, peccaries and hippopotamuses). The chevrotains are considered primitive ruminants, resembling the species that represent the link between ruminants and non-ruminants and have therefore been called the living fossils. They have a simpler stomach, and four-well developed toes. They lack upper incisors (present in other ruminants) and have only three premolar teeth. They lack the antlers but males possess projecting tusk-like upper canines that grow continuously as in the musk deer. These canines are smaller and peg-like in females. They also lack the specialized scent glands below the eyes or between the toes present in true deer. Communication is limited to urine, pellets, and vocalization. The dental formula is 0/3, 1/1, 3/3, 3/3.

The Indian chevrotain is as big as the black-naped hare (*Lepus nigricollis*). Weighing a maximum of 3 kg, it is the smallest ungulate in Indian forests. The coat color is reddish-brown with a pattern of white spots fusing into stripes along the flank and rump. There are three white stripes across the throat.

The distribution of the Indian chevrotain is confined to Central India, in the Eastern Ghats up to Odisha, and in the Western Ghats which may have the best population of the species. The Kalakad-Mundanthurai Tiger Reserve, at the extreme end of the Western Ghats, appears to be one of the best-protected areas for the species. Other PAs in the Western Ghats where one can encounter the species are Periyar Tiger Reserve, Anamalai National Park, Parambikulam Tiger Reserve, Silent Valley National Park, Bhadra Wildlife Sanctuary, Kudremukh National Park, and Kali Tiger Reserve. The beautiful forest complex comprising of Mudumalai Tiger Reserve, Bandipur Tiger Reserve, Nagarahole Tiger Reserve and Wayanad (together forming the Nilgiri Biosphere Reserve spread over 5,520 sq. km) offers the habitat contiguity that is much-needed for the long-term conservation of this and many other species.

Along the Eastern Ghats, populations should occur along the Nallamalai Hills, Nagarjunasagar Srisailam Tiger Reserve, and the Similipal Hills. The renowned wildlife biologist, George B. Schaller notes in his classical publication on Indian mammals, The Deer and The Tiger, the occurrence of Indian chevrotain in Kanha National Park. If not observed carefully, piglets with stripes may be mistaken for mouse deer. The Chevrotain may often be confused with young wild piglets and could have led to the belief that mouse deer occurred as far north as Nepal. In recent years, much camera-trapping for tiger and other wildlife has happened in Indian and Nepal terai and so far no mouse deer has been camera-trapped.

Very little is known about the ecology and behavior of the Indian chevrotain with much of the information being in the form of anecdotal observations and sight records. Like other forest ruminants, adult chevrotains are mostly solitary except at the time of courtship. During the day, the chevrotains stay concealed in dens that may be hollows in the logs, tree holes, or under rock shelters.

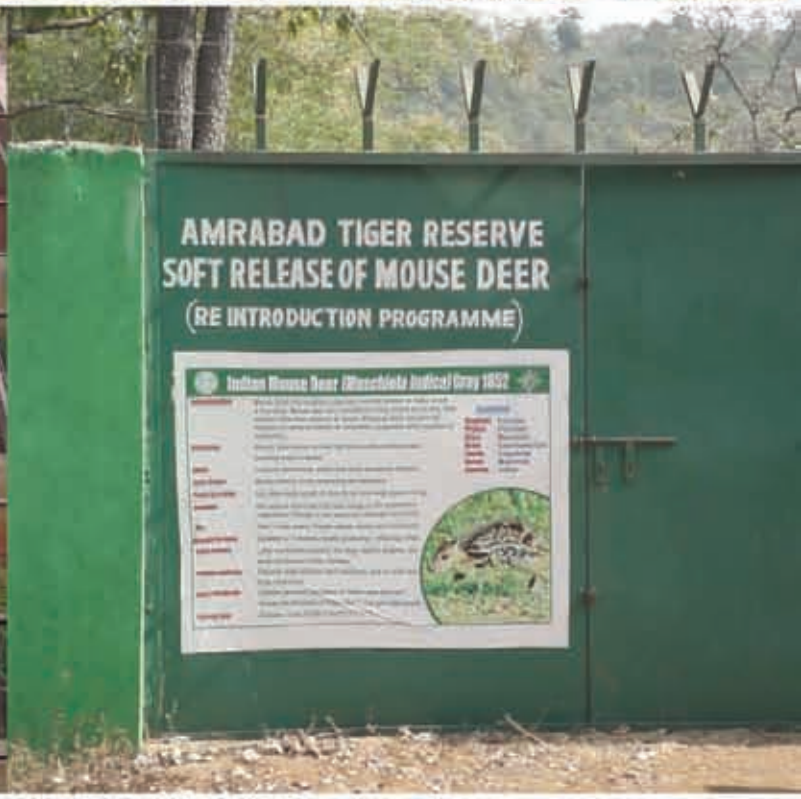
They are also reported to climb up sloping tree boles and reach the hole on the trunk for daytime resting. Their average population density in a well-protected area could be around 1/sq.km. Although they are occasionally seen during the day, the species can be said to be nocturnal. Research in Mudumalai Tiger Reserve, by Tharmalingam Ramesh and his colleagues from the Wildlife Institute of India, indicates that in the drier part of the Reserve, cool patches of bamboo clumps and dense understory are vital for their survival.

If the observer is silent, at night it is possible to observe the species with a powerful light. Like barking deer (*Muntiacus muntjak*) Indian chevrotains forage for tender shoots and fallen fruits on the forest floor. *Bridelia retusa, Dillenia pentagyna, Emblica officinalis, Garuga pinnata, Gmelina arborea, Madhuca longifolia, Melia dubia, Randia dumetorum, , Terminalia bellirica, T. chebula, Ziziphus mauritiana* and *Z. rugosa* are some tree species whose fruits are eaten by chital (*Axis axis*) and sambar (*Rusa unicolor*) and would also be eaten by the chevrotain. As chevrotains regurgitate the seeds 2-3 days after eating the fruits, they may play an important role in seed dispersal and regeneration in the forest.

This species is reported to have a gestation period of around five months. One young is born in a sheltered place; the mother ingests the placenta and is ready for mating within two days after giving birth. All the predators, small and large, present within the range of the chevrotain could be preying on this small ruminant. The list would include Indian Rock Python (*Python molurus*), Mugger (*Crocodylus palustris*), Jungle Cat (*Felis chaus*), Nilgiri Marten (*Martes gwatkinsii*), Jackal (*Canis aureus*), Dhole (*Cuon alpinus*), Leopard (*Panthera pardus*), and Tiger (*P. tigris*). Even the adult mongoose (*Herpestes spp*), large Monitor Lizards (*Varanus spp*) and Eagle Owls (*Bubo spp*) can prey on young mouse deer. Poaching at night using powerful lights and hunting with dogs is a major threat. In the drier parts of its range, uncontrolled summer fires can kill mouse deer.

If poaching is prevented, the species can continue to survive in the forests of peninsular India. Loss of forest habitat due to encroachment, felling for timber, linear development also threatens this species' safe survival. Though the IUCN Red List of Threatened Species places the Indian chevrotain in the Least Concern category, India's Wildlife (Protection) Act, 1972, acknowledging the threats faced by the species, accords maximum protection by placing it in Schedule I of the Act.

Since 2010, Nehru Zoological Park in collaboration with the Laboratory for Conservation of Endangered Species (LaCONES) of Centre for Cellular and Molecular Biology (CCMB), and Central Zoo Authority, Delhi have been carrying out a breeding program for the conservation of mouse-deer. The conservation breeding program has been a success story as more than 200 individuals have been born in captivity from the initial founder population of 6 individuals. More than 150 individuals have been released in several protected areas such as Amrabad Tiger Reserve, Mrugavani National Park, and Kinnerasani wildlife Sanctuary in Telangana State thereby making it one of the largest and successful planned reintroduction programs from zoos to the wild in recent history.


AMRABAD TIGER RESERVE
SOFT RELEASE OF MOUSE DEER
(RE INTRODUCTION PROGRAMME)

Long-billed vultures | Credit: Mandy West

Species in focus

The Asian Vulture Conservation Story

How ex-situ work is key to Saving Asia's Vultures from Extinction

Text & Photos: Dr Chris Bowden
Globally Threatened Species Officer & SAVE Programme Manager
Co-Chair of IUCN Vulture Specialist Group

From being some of the most abundant large raptors in the world to a Critically Endangered status on the IUCN Red Data list in the space of just ten years – the Asian vulture story is almost unparalleled. The puzzle of what was driving declines of these magnificent and keystone species with their important role in cleaning the environment was unraveled only by 2004, when the veterinary NSAID Diclofenac, widely used for cattle, often non-judiciously, was identified as the main driver. Because domestic cattle form such a major part of these vultures' diets, any toxic substance given to cattle can have a devastating knock-on impact on scavengers that consume them.

One key action agreed in 2004, considering the terrifying speed and extinction trajectory of the ongoing declines (40-50% declines per year!), and recognising that removing Diclofenac was unlikely to be easy or fast, was the urgent establishment of conservation breeding programmes to secure the three most directly threatened vulture species. This was quickly endorsed by the Indian Government National Vulture Action Plan in 2006. With a combination of NGOs working with state governments, there was just enough time to react while there were still some wild birds available as founder populations.

Vultures exit release aviary in Nepal | Credit: Bird Conservation Nepal

Safety testing by IVRI | Credit Chris Bowden/RSPB

Long-billed vulture chicks |Credit Melissa Nollet

Bringing injured birds from around the country, and chicks from the remaining wild colonies was a challenge taken up by the Bombay Natural History Society (BNHS). Dr Vibhu Prakash, who was involved in earlier studies and monitoring has spearheaded the efforts ever since then. His data from Keoladeo National Park and wider road transects have been crucial systematic information that documented the severity of the declines. Despite some initial resistance to the urgency for this step, with important early support from state governments of Haryana and West Bengal, and from the UK's Royal Society for the Protection of Birds (RSPB), and Darwin Initiative (UK Government grants), the first centres and founder populations of all three species were successfully established. Assam soon followed, along with other state initiatives where the Central Zoo Authority (CZA) also provided vital support.

As the birds brought into the centres were young, and since they don't normally breed until aged 5-6 years, it took time before breeding took off. But thanks to the wealth of expert advice one could draw upon, notably from UK raptor breeding expert Jemima Parry-Jones, there was always great confidence that with time and dedication, breeding success would follow. Jemima had designed the large 'colony aviaries', and the program also drew heavily on experience from the California Condor program in the USA as well as European experience for more closely related species. And follow – it certainly has, with over 60 now fledging per year for the three species combined…

In terms of conserving the wild birds, of course, it is the in-situ measures that are crucial. It was undoubtedly the Indian Government's (together with those in Nepal and Pakistan) ban on the manufacture, sale and all veterinary use of veterinary Diclofenac declared in 2006, which has made the biggest impact. It has ultimately slowed, and probably prevented the total extinction of these species. But sadly, this alone is not enough, particularly since human formulations of Diclofenac have remained widely available, and the drug was rather cynically being produced by many manufacturers in inconveniently large, veterinary-sized doses for potential illegal use. This loophole was thankfully closed in 2015 by the Indian Government.

Unfortunately, further problems have emerged and some similar veterinary drugs have also proved to be toxic to vultures. These are unlike Meloxicam, also an NSAID/painkiller which the Indian Veterinary Research Institute (IVRI) and BNHS had shown through safety-testing to be a safe and effective alternative option. The measures needed to identify and

implement the necessary actions have been led by science and a co-operation between a wide array of government and non-government organisations.

Since 2011 24 organisations have pulled together more closely under the banner of 'SAVE' – Saving Asia's Vultures from Extinction www.save-vultures.org and SAVE has provided an annually updated Blueprint Recovery Plan for the six range countries that hold populations of the most threatened vulture species. Recent publications from these SAVE Partners including the IVRI have highlighted that similar to Diclofenac being highly toxic, Aceclofenac, Ketoprofen and Nimesulide are all widely and increasingly used in veterinary practice, and have similar properties when it comes to killing vultures, and unfortunately, also need to be removed from use in large animal veterinary practice. There is a crucially important programme of safety testing being carried out by the IVRI with support from the Indian Government and SAVE, but this is happening too slowly.

Having established husbandry and management protocols, breeding success is now high, and numbers are increasing steadily in the centers, and with the tried and tested double-clutching techniques, it could actually be increased still faster.

White-rumped Vulture |Credit: Chris Bowden/RSPB)

The current network of Indian conservation breeding centers acts as important holding populations of these species which remain Critically Endangered, the highest designation by IUCN short of extinction. The protocols for breeding these species which had never previously bred in captivity have now been documented in husbandry manuals, with the Haryana center at Pinjore being the showcase example. The centres also act as important focal points of expertise and provide natural opportunities for publicity and for highlighting the precarious plight of these magnificent birds. The Indian Government has recently stepped up its financial support, as costs are high and smooth running and flow of funds is essential for such a globally high-profile programme. But ultimately, it will be the success of addressing the remaining threats in the wider environment which determines whether the programme achieves its conservation goals - and there are major challenges that remain here in testing and removing those toxic drugs from wider veterinary use.

All Vulture breeding centres play a crucial role in bringing conservation attention and high profile opportunities for future releases. But before those releases can go ahead, and although we are now at an exciting phase of the programme, the environment must be carefully monitored for remaining drugs that have already pushed these species so close to extinction, and where they are still present, then further measures will be urgently needed. All released birds must be carefully tracked and monitored, and the cause of any mortalities determined – all of this is a big challenge and needs major continued efforts. Once released birds have joined with remaining relict wild populations and started breeding themselves in the wild, along with wild populations also recovering, then we shall truly celebrate the vulture programme and the newly updated Government's Action Plan for Vulture Conservation in India as a grand success.

Pygmy Hog Adult Male | Photo: Parag Deka.

Species in focus

Pygmy Hog

Programme- Saving Pygmy Hog from Extinction

Text & Photos: Parag Jyoti Deka[1,2], Dhritiman Das[1], Goutam Narayan[3]

1 Durrell Wildlife Conservation Trust - Pygmy Hog Conservation Programme (PHCP)
2 Aaranyak - Threatened Species Recovery Programme (TSRP)
3 EcoSystems-India - Rare & Endangered Species Conservation Unit (RESCU)

Pygmy Hog mother and new born | Photo: Parag Deka.

About 24 years ago, six wild pygmy hogs (*Porcula salvania*) were brought into captivity for conservation breeding as insurance against the extinction of one of the most endangered mammals in the world. Since then, 172 litters have been born in captivity and 130 (62 males, 68 females) individuals have been sent back to the wild. The Pygmy Hog Conservation Programme (PHCP) also emphasizes scientific management of the habitat for the establishment of this sensitive indicator species through successful reintroduction.

The Conservation Programme

The pygmy hog is the world's smallest and rarest wild pig and is most threatened by extinction. It belongs to a unique genus that has no close relative. The species was originally found in the narrow belt of tall, alluvial grassland plains that runs across the southern edge of the Himalayas in the Indian subcontinent. However, by 1993 it was reduced to a single population found only in a few pockets of the Manas National Park (MNP).

Pygmy Hog Research and Breeding Centre, Basistha | Photo: Parag Deka

The Durrell Wildlife Conservation Trust (www.durrell.org) along with the IUCN/SSC Wild Pig Specialist Group initiated the Pygmy Hog Conservation Programme (PHCP) in 1995 to save the pygmy hog from extinction. It partnered with the Assam Forest Department, Ministry of Environment Forest and Climate Change, a local NGO partner, EcoSystems-India, and since 2018, a second local partner -Aaranyak to implement the programme. The main aim of the programme is conservation breeding and reintroduction of pygmy hogs after habitat restoration, as well as monitoring existing and potential grassland habitats for the species.

Conservation Breeding

PHCP holds almost the entire global captive population and maintains about 70 captive hogs at its two centres in Assam and breeds more hogs every year for release. The highly successful captive breeding project of PHCP began using six (2 M: 4 F) wild hogs captured from the last surviving population of the species in Manas National Park in 1996. Later, a young male rescued in 2001, and another male and two females captured in 2013 from the same range joined the captive breeding stock. PHCP also provided pygmy hogs to Assam State Zoo Cum Botanical Garden for public display in 2014.

Before releasing them into the wild, the hogs are imparted with survival training at a 'pre-release' facility near Nameri National Park where they are kept for about five months with minimal human contact and are conditioned to face the wild environment and along with enhanced opportunities to forage naturally. The simulated grassland habitat in these large enclosures helps the hogs to learn survival skills in the wild and behave like wild animals.

A pygmy hog escaping to wild from release enclosure in Rupahi Bhuyanpara Manas | Photo: Goutam Narayan

Pygmy Hog trasport Crates placed in the release site at Manas
Photo: Goutam Narayan

Pygmy Hog Pre-release enclosures | Photo: Parag Deka

Reintroduction of Pygmy Hog

The reintroduction of captive hogs in the wild began in 2008. Initially, three Protected Areas from their past distribution range in Assam were selected for better protection and restoration of alluvial grasslands. Over the next decade, 35 hogs (18 M: 17 F) were released in Sonai-Rupai Wildlife Sanctuary, 59 (26 M:33 F) in Orang National Park, and 22 (11 M:11 F) in Barnadi Wildlife Sanctuary. The reintroductions in Orang National Park have been particularly successful as they have multiplied almost two and a half times in number, and have spread to areas far from release locations.

In 2020, this iconic species returned to their home where their last original population still survives but has dramatically declined. It has been estimated that with the release of 14 (6 M: 8 F) hogs in Rupahi grasslands in the Bhuyanpara range of Manas in May 2020, the total number of reintroduced hogs and their progeny may have reached 200 in the four release sites. The release of about 60 hogs has now been planned over 5 years in the Bhuyanpara range of Manas from where they had disappeared.

Road ahead

Till 2018, the PHCP was guided by the IUCN Species Action Plan (SAP) 1993, prepared by the Wild Pig Specialist Group. The revised SAP has been enacted with a long term vision till 2030. The PHCP is guided by Durrell's 'Rewild Our World' strategy which includes two associated plans that map out the programme until 2025. The Manas Plan renewed the focus of PHCP on the recovery of grasslands and the grassland obligate species and reconnecting the fringe community with the biodiversity of Manas. At the same time, the Pygmy Hog Plan continues the conservation breeding and envisions establishing pygmy hog populations through reintroduction in the remaining sub-Himalayan grasslands to ensure their long term survival.

Under these plans, a trial of different grassland management practises has been initiated in Manas to design an efficient model for the same. Similarly, the community actions in the fringe villages of the Park have been initiated to identify the drivers of anthropogenic pressure on grassland habitat and to reduce them by designing targeted and sustainable livelihood interventions.

Cheer Pheasant *(Catreus wallichii)* | Credit: Adrish Poddar

Species in focus

Ex-situ Conservation of Pheasants

Text & Photos: Dr Rahul Kaul, Senior Director Wildlife Trust of India
With inputs from Shri Lakshminarasimha, R. Scientific Officer, CZA

Pheasants have been part of several ex-situ facilities many years before a systematic plan for the Conservation Breeding Programme was launched by the Central Zoo Authority. The initial purpose of these pheasant collections was to generate awareness about the varied forms of animals (pheasants included) found around the world. Thus, mostly exotic collections such as the Silver and the Golden Pheasants were kept in various zoos across India. With time, the concept of "captive breeding" emerged, largely driven by the dwindling in-situ populations of wild animals and birds, and the need for insurance against a decline. Native pheasant species were held in aviaries with the aim to breed and increase their numbers. The intended in-situ replenishment by an ex-situ stock perhaps had never happened and if it did, was not successful or was not worth a mention. The world then advanced to the concept of conservation breeding – the intent of breeding for conservation and in-situ release and conservation. Therefore, this concept laid equal emphasis on both ex-situ production and an in-situ release, monitoring, and conservation.

In the early 1980s, the World Pheasant Association (WPA), trained a few young forest officers from India in pheasant captive breeding techniques in the UK, and on their return, these forest officers set up pheasant breeding facilities in their home states. The Blyth's tragopan captive breeding center at the Kohima Zoo and the pheasant breeding program in Jammu and Kashmir (mostly for the Himalayan Monal) was one such initiative that ensued as a result. Around this time, the Himachal Pradesh Forest Department established aviaries at Blossom and Khadiyun with Cheer Pheasants. Soon, the Sarahan Pheasantry was set up for the Western Tragopan. The Chail Breeding Centre bred and reared cheer pheasants in reasonable numbers (currently housing nearly 70 birds) while Sarahan faced problems with breeding and rearing perhaps because cheer seems to be a sturdier species in captivity.

Chail Breeding Centre | Credit: Adrish Poddar

In 2003, CZA and WPA conducted a workshop on the conservation breeding of pheasants, with the active participation of PA managers and zoos across the country. This workshop greatly rekindled the desire and need for conservation breeding once again. The CZA supported it with funds and the breeding facilities in Chail and Sarahan were upgraded and one more facility was set up in Manali for the then state bird – the Himalayan Monal. Himachal Pradesh became the torchbearer of the pheasant conservation breeding movement and invited breeding experts of the WPA for valuable inputs on the design, upkeep, diets, and other facets of conservation breeding including the now well-understood concept of "parent rearing". As parents pass on the skills needed to survive in the wild post-release, such facilities, in the form of larger aviaries were provided where parents and chicks could interact as they would do naturally.

WPA also supported the training of several officers and zookeepers in the UK and facilitated their exposure to several facilities. Himachal also became the first state to form a 'core group' that consisted of forest officers, independent experts, and local politicians that met once or twice a year to review the progress of the three conservation breeding projects.

The state also roped in the Wildlife Institute of India as part of a research project to advise on habitats where the bred individual of Western Tragopan could be released. While cheer continued to do well and spread good cheer, the western tragopan struggled, firstly with the breeding and then with chick survival. However, this was a learning curve, and today this facility boasts surplus birds, although with a narrow genetic base. From five individuals in 2004, the stock has now grown to 47 individuals (25 males and 27 females) as of March 2021. This is the highest population size achieved since the inception of the conservation breeding program. Over the years of housing Western Tragopan, there is now adequate husbandry experience in keeping and breeding Western Tragopan.

As steady population growth is achieved at the center, an experimental reintroduction of the species has been taken up at Daranghati Wildlife Sanctuary. Similarly, the Red Junglefowl, the ancestor of all domestic poultry, can easily interbreed with the domestic chicken, and the genetic purity of the species became a cause of concern. Several facilities like the one at Morni (Haryana) were set up to keep and breed the Red Junglefowl.

After the formal launch of the conservation breeding program of the CZA, many species were added to the list of pheasants identified for conservation breeding. These included Hume's pheasant in Aizawl Zoo and Satyr tragopan and the Blood Pheasant in the Darjeeling Zoo. Currently, 13 of the 17 species found in India feature in this list. Unfortunately, so far, very few species and facilities have succeeded in meeting the ultimate objective of augmenting the wild populations.

What are the lessons learned? Do all species need conservation breeding? Should this be a lifelong effort or a time-bound one? Should these efforts be centrally driven and funded or the states take up based on need, capacity, and feasibility? These questions continue to worry us.

Conservation breeding is considered a last resort when all efforts to conserve populations in-situ fail. This means the species either has a low abundance in the wild or has already become extinct locally. Should we wait that long to take the birds into captivity? If we do wait that long, we would be confronted with problems like lack of or an insufficient number of founders.

So, taking the species into captivity much before it becomes too sparse must be thoroughly understood first. Therefore, any species identified for conservation breeding must have enough prior information on its population status and distribution in the wild for evidence-based decisions.

To start with, the 13 species listed for conservation breeding in India must be supported with periodic data on their status in the wild. We need to have a robust species conservation planning process for choosing a species for conservation breeding based on the five-step decision process outlined by IUCN to develop an integrated conservation strategy. The duration of the project is an important consideration as duration drives targets. If we require a certain number of birds for release at the end of 10 years, we should be able to work backward to estimate the number of founders needed. Also, long-term planning allows effective budgeting, milestones, and deliverables and thus the monitoring of the progress of the project. Capacity and science-based interventions are also crucial.

Female Blyths Tragopan | Credit: Lakshminarasimha R

Humes pheasant in Aizawl zoo | Credit: Rahul Kaul

For example, Blyth's tragopan conservation breeding project established in 1985, has failed to produce a single bird for release even after 35 years. However, progress in terms of breeding (including successful parent rearing) has been achieved in recent years. An in-situ project must be driven by the respective state forest/wildlife department, but our experience shows that after the novelty wears off there is generally a lack of enthusiasm and prioritization for pheasants. Funding, or the lack of it, seems to be the main culprit and in absence of a firm plan with financial allocations and planned outcomes, this is expected. A long-term plan such as one outlined in CZA Guidelines for conservation breeding ensures continuity of thought and direction and ensures that routine transfers, that are common in the forest department, do not affect the project adversely. The funding support would need to be generated together by CZA and the respective state government prior to the commencement of the project.

Collaboration with international breeding programs such as those run by the European Association of Zoos and Aquariums (EAZA) and Association of Zoo and Aquaria (AZA) should offer better support and will add credibility and provide scientific directionality to the program. It is therefore urgently needed to dovetail the species identified by CZA for conservation breeding with the species identified for recovery by the Ministry of Environment Forests and Climate Change under the Recovery of Endangered Species program and other National Action Plans. Another challenge is that several facilities set up for conservation breeding are with no or few founders, rendering these unviable in the long run. While this is a catch 22 situation – should founders be found first and the project approved later or should the facility be created first.

Whatever the sequence, identification of founders should be afforded the highest priority because, in absence of founders, even a well-funded project may stay grounded. Conservation breeding is a very useful tool to aid in-situ recovery but must be used effectively to gain the desired outcomes in a given time frame.

Cheer Pheasant | Credit: Arpit Deomurar

Blyth's Tragopan at Nagaland Zoological Park, conservation breeding centre
Credit: Lakshminarasimha R

Newly emerged *Manouria emys* hatchlings at NZP | Photo: Shailendra Singh

Species in focus

Asian Brown tortoise

Saving Endangered Asian Brown Tortoise through Ex-situ Conservation in North-east India

Text & Photos:

Shailendra Singh and Parimal Ray - Turtle Survival Alliance- India Program

Prabhat Kumar, IFS- Nagaland Zoological Park

Nature is slow but sure; she works no faster than need be; she is the tortoise that wins the race by her perseverance.
Henry David Thoreau

A male *Manouria* at Nagaland Zoological Park | Photo: Shailendra Singh

The Asian Brown tortoise (*Manouria emys*) is believed to be among the most primitive of living tortoises, based on molecular and morphological studies. Endemic to southeast Asia, it is the 4th largest tortoise in the world. The species is precariously threatened and is unfortunately locally extinct in certain habitats across its range. Indian Zoos present a unique opportunity to set up conservation breeding and recovery programs for native endangered species. A modest conservation breeding project targeting M. emys was initiated by Turtle Survival Alliance-India and Nagaland Zoo/Nagaland Forest Department in 2017 through an official partnership. The major goal of this project is to recover/establish two wild populations in the state and elsewhere in the region.

A juvenile *Manouria emys* at NZP Photo: Shailendra Singh

Since the inception, the project team diligently worked on pre-defined objectives. As first step surveys of northeastern zoos were undertaken to document the *M. emys* cohorts as well as examine the potential to set up conservation programs. 11 Northeastern zoos were visited and 5 zoos with captive populations/ individuals of *M. emys* were listed.

Three cohorts (Mizoram, Manipur, and Diphu region of Assam) presented the opportunity to set up sustained conservation breeding programs for *M. emys* besides the Nagaland Zoo, where such an initiative was already in place. Training program for all the regional zoos of North-east India was conducted at Nagaland Zoological Park in 2018 to provide networking opportunities for the zookeepers and frontline staff to exchange information about tortoise (and turtle) husbandry.

The Conservation breeding program was started with 13 (4 males and 9 females) adult *M. emys* individuals, housed in the collection of Nagaland Zoological Park (NZP). Tortoises were transferred from the display into the off-display conservation breeding area. Breeding enclosures were separated from the visitor area/display unit to minimize the disturbance, especially during courtship and nesting.

All the individual animals were marked with passive integrated transponders (PIT) tags and paired into four appropriate breeding groups for successful courtship and nesting. Additional males were separated from nesting females to reduce the stress and disturbance during the nesting.

The diet of captive cohorts was improved by incorporating green vegetables and they were provided with appropriate substrate and nesting material (dried grass and husk) to catalyze successful breeding. The nesting behavior and reproductive output from individual females were carefully monitored. The appropriate grouping and sex ratio of males and females during courtship and nesting was critical in kickstarting the breeding program.

The artificial incubation units, using styrofoam boxes and vermiculite, were prepared prior to the laying of eggs by females in the month of April 2018. The humidity was kept above 70% in all the boxes to mimic the natural nesting environment of the species. Thermohygrometer was installed for measuring the room temperature and humidity and a digital thermo-hygrometer was placed to record temperature and humidity within the incubation chamber.

Project Team translocating the nests to indoor incubation | Photo: Shailendra Singh

From April through June 2018, four nests were secured with a total of 144 eggs. From them, 70 eggs were moved to an indoor incubation facility. Total 29 eggs out of 70 hatched successfully. Unfortunately, during 2018-19, 19 hatchlings succumbed to winter-induced infection. Until 31st March 2019, 10 hatchlings remained in Nagaland Zoological Park from this batch. In 2019, there was better hatch success and survival rate and currently, 61 hatchlings are maintained with appropriate husbandry protocols. In 2019, a dedicated nursery enclosure was set up at Nagaland Zoological Park, and currently, the process to establish a dedicated incubation facility to maximize hatching success is ongoing.

Participants of Tortoise husbandry training | Photo: Parimal Ray_TSA

Information on the historic, as well as present distribution records for the species in the wild, is being collected by the project team to attempt pilot release once the juveniles attain a weight of 1000 grams. Upon identification of safe habitat, a detailed habitat evaluation will be carried out as per the IUCN protocols. Phase-wise reintroduction (or supplementation) will be carried out post comprehensive health assessment, release, and monitoring of juveniles through GPS-based radio-telemetry. For ensuring the survival of released individuals, support from local ethnic groups would be critical, and engagement with various groups will be continually managed. Further, the plan would be to use selected community forests as local release sites through stakeholder support. Local village youth will be involved as field assistants.

We recommend regional conservation breeding programs for this species, where all zoos, those housing this species could participate. This will help in maximizing the genetic diversity and build a detailed knowledge base. The founder's stock of this species will not be exchanged with other specimens until the recovery program is fully in place. The regional model would collaborate with TSA's Myanmar and Bangladesh Manouria program for expanding the same. Strengthening and expansion of this conservation breeding program will not only protect this magnificent species, but also the wet montane mid-elevation forests, where it lives!

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Asian Brown Tortoise | Photo: Shailendra Singh

ZOO in focus

Wellington Zoo, New Zealand

The Zoo with the biggest heart

Text & Photos: Karen Fifield MNZM, Chief Executive

Wellington Zoo is New Zealand's first Zoo and has been operating on the same site since 1906 with the ethos; Me tiaki, kia ora.

Me tiaki, kia ora! Is our indigenous Māori language, meaning – we must act so that all life can thrive! The zoo is the New Zealand capital city Zoo and was established in 1906. The city has 200,000 people and zoo visitation is 250,000 per year. The zoo has 100 staff across all facets of zoo operations and over 70 volunteers who really love their zoo and contribute to the work with animals and visitors through their passion and knowledge. The zoo houses over 500 animals from over 100 species on the 14-hectare site, located on the Green Belt of the city.

Wellington Zoo is the world's first total carbon zero certified zoo and has received a number of awards for environmental sustainability, conservation, zoo design and business leadership, including the Supreme Business of the Year for the Wellington Region. Wellington Zoo was the recipient of the World Association of Zoos and Aquariums inaugural Environmental Sustainability Award in 2018.

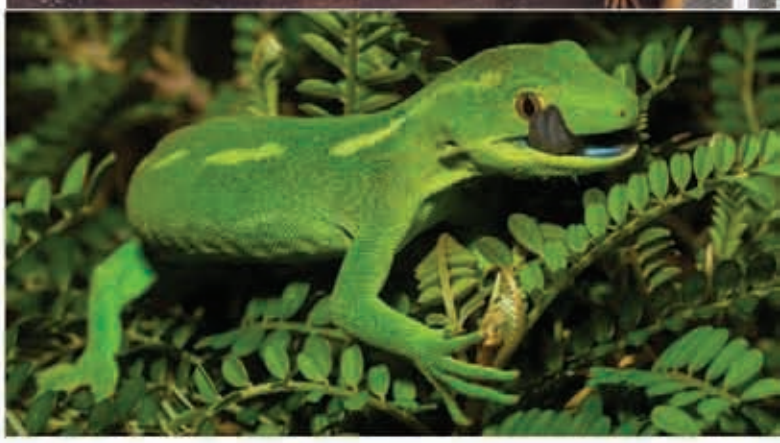
The state of the art animal hospital, The Nest Te Kōhanga, cares for injured indigenous wildlife as well as zoo animals, and this is the only one of its type in the Wellington region. This facility is also accessible to zoo visitors to see veterinary work in action and hear from our Animal Care Team during any veterinary

care procedures. The zoo team further contributes to research data collection for the animals brought in, e.g. lead poisoning in Tūi in the Wellington region, plastics in seabirds such as Albatross, and provides veterinary specialists for research work in Antarctica in partnership with NIWA. The veterinary team was part of the critical response team for Kākāpō last year. Moreover, there are a number of Unitec and University students studying at the Zoo each year, including offering a joint Masters in Wildlife and Zoo Medicine with Massey University's Tāwharau Ora, School of Veterinary Science.

The zoo staff are entitled to apply for Conservation Fund Staff Grants to work with conservation partners such as Proyecto Titi in Colombia, Free the Bears in South East Asia, Madagascar Fauna and Flora Group, West Coast Penguin Trust and Kea Conservation Trust. They are also entitled to one week of Conservation Volunteering Leave each year to support a conservation programme close to their hearts.

The zoo has several community accessibility programmes that are run throughout the year including an annual Neighbour's Night, where all of the Zoo's immediate neighbours (a number of whom are in social housing) are invited to the Zoo for a fun day out. It is normally hosted on an Open Weekend in May each year whereby the community can visit the Zoo for a gold coin donation and the money raised over the weekend is donated to the Zoo's Conservation Fund.

There is a learning experience outside the Classroom contract with the Ministry of Education. The zoo provides Science, technology, and Maths-based experiences. Further, there are learning-based sleepovers, Bush Builders environmental literacy programme and school holiday programmes. With three other Zoos in New Zealand, there are conservation education learning sessions for kids from under-served communities (Decile 1-3 schools) through a partnership with The Warehouse Group.



Wellington Zoo collaborates with Victoria University of Wellington on research that will boost the learning experiences of younger visitors. As a first, a research team from the Infant and Child Cognition Lab is trialling a study at the Zoo, focusing on how children think about animals and how that helps them develop empathy with animals and humans. Second, the Teaching and Learning Research Initiative is a group of schools and Learning Outside the Classroom providers investigating learning experiences in informal learning settings.

The zoo is committed to the strategic intent of being the 'Zoo with the Biggest Heart' and being a voice to be heard for animals, people and the planet.

ZOO in focus

Mahendra Chaudhary Zoological Park, Chhatbir, Punjab

Text & Photos: Mr. M.Sudhagar, IFS, Ex-Field Director MCZP, Chhatbir

M.C Zoological Park, popularly known as Chhatbir Zoo, is one of the largest zoos in Northern India. It caters to the needs of wildlife tourism and education not only to the citizens of Punjab and Haryana and Chandigarh but also to the tourists who visit from adjoining states.

The zoo spans across an expanse of 505 Acres and houses close to 1,500 animals of 125 species of wild fauna. This area was once a hunting reserve of the Maharaja of Patiala. The location next to the Ghaggar river, its alluvial plain landscape, the rich natural Biodiversity, and the pollution-free environment, make it one of the most naturalistic settings for a zoo in the country.

In today's times, with greater global connectivity and several information channels, the expectations of zoo visitors have altered significantly. This is true not only in terms of animal displays but also in the other aspects like visitor facilities and the overall ambiance of the zoo. This has further led to the zoo management initiating various new eco-friendly programs viz: adopting battery-operated visitor carts and service vehicles, ensuring plastic-free zones and a garbage-free environment, initiating solid waste management and production of compost. The natural environment of the zoo has significantly improved and this has provided an opportunity to sensitize zoo visitors towards a more holistic approach towards sustainable living and a lower carbon footprint.

Chhatbir Zoo has many special and unique attractions such as Chhatbir Bird Park, Wildlife Safari (Lion Safari & Deer Safari), Nocturnal House, Reptile house, etc. By having seven different themes in architecture and species composition, the Chhatbir Bird Park has become one of the longest and largest walk-in-aviary in India and the most attractive and visited facility of the Zoo in recent times.

Visitors can take a walk for 30 minutes inside a protected walkway where colorful birds of different species fly in naturally, giving a surreal experience. In this Bird Park, students learn about birds from the terrestrial and aquatic ecosystem of North India, and the rainforest of South India. They can also glimpse into the lives of non-native bird species of the Amazon and Australian Forests. To make a trip to the zoo more attractive, especially for children, a new Chhatbir Dinosaurs Park with robotic dinosaurs is under the process of completion using the PPP (Public-private partnership) model.

Chhatbir Zoo has also taken up conservation breeding programs for some species like the Gharial (*Gavialis gangeticus*), Sarus Crane (*Grus antigone*) , Tiger (*Panthera tigris tigris*), and Red jungle fowl (*Gallus gallus murghi*) among others.

Gharials, which were reported to be extinct in the Beas river of Punjab, have been successfully re-introduced by the Wildlife Wing of the Punjab Forest Department. For this purpose, 50 Gharials were brought from Eco center, Morena, Madhya Pradesh by the technical team of Chhatbir Zoo. The animals were kept in a simulated environment and fed live fish in Chhatbir Zoo for some months prior to release.

Based on the knowledge gained from successful management models, Gharials were scientifically managed in the Zoo and transported in customized containers to Beas river. After the successful reintroduction of around 50 Gharials in 2017-2018, the forest department is now planning to restock the Gharial in regular intervals by involving Chhatbir Zoo as a nodal agency.

Chhatbir zoo gives the highest degree of importance to education, awareness, and outreach targeted at children and youth as they will be the protectors of the future. With this in mind, the zoo administration has come up with a new initiative, the Students Zoo Club program, specially designed for school students to encourage the school students to visit Chhatbir Zoo and create awareness about the wildlife through guided activities. Member Schools derive the benefit of discounts on group visits, free guided tours, interpretation and education activities with experts, and free participation in competitions and other zoo awareness education activities. Within a short duration of implementation, 659 schools have become registered members of the club and have benefited from the program.

With new and improved visitor facilities, improvement in quality of the public amenities, professional management of visitor services, the satisfaction level of the visitors to Chhatbir Zoo has increased. To add another feather in its cap, Chhatbir Zoo has recently become one of the Zoos from India to obtain the membership of the World Association of Zoos and Aquariums (WAZA), which is a global alliance and the largest global conservation network of Zoos. We now plan to showcase the 'Chatbir model' of supporting ex-situ conservation and outreach, to the global community.

Adjutant Storks

Chimpanzee with German Curator

White Pelicans with a Heritage Building in backdrop

from the pages of HISTORY

Sri Sayajibaug Zoo, Vadodara, Gujarat

Text & Photos: Dr. Pratyush Patankar - Curator, SSZ

The zoo and the public gardens, formerly known as 'Kamatibaug' is a wonderful gift to the citizens of Baroda by the erstwhile visionary ruler of the then Baroda state, H.H. Shrimant Maharaja Sayajirao Gaekwad III. It was in the year 1875 when the king selected a tract of land on the bank of river Vishwamitri to develop a vast public garden and zoo. To make his project a reality, the royals handpicked the best landscape planners, horticulturists, and curators from Europe and deployed them on this project. With dedicated effort and hard work for almost four years, on 8th January 1879, the Maharaja opened up this beautiful public garden and the zoo to his beloved citizens. The zoo, since then, has witnessed a glorious conservation journey of 142 years.

Since 1960 Sri Sayajibaug Zoo of Vadodara has been managed by the Vadodara Municipal Corporation. Situated in the heart of Vadodara city, Sri Sayajibaug Zoo (popular by the name of Baroda zoo) and the adjoining public gardens spread over approx. 110 acres are not just major tourist destinations but this vast green space also function as the 'green lungs of the city. Having said that, the zoo is also in the process of major revamp especially in housing facilities through phase-wise redevelopment projects. The zoo has a rich history of conservation of natural heritage and shall continue to contribute towards ex-situ conservation keeping the legacy and pride of the historic city in mid and marrying it with modern-day zoo management practices for maximizing the conservation measures.

Old Duck Pond

Sarus Crane - Treatment

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