



ex-situ

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Central Zoo Authority
केन्द्रीय चिड़ियाघर प्राधिकरण



Ministry of Environment Forest
and Climate Change



"Securing Species: Ex-Situ Actions for Conservation"

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ex-situ

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FROM THE DESK OF

MEMBER SECRETARY



Conservation today calls for a thoughtful balance between protecting wildlife in their natural habitats and supporting species through well-planned ex-situ conservation efforts. The articles compiled under the theme “Securing Species: Ex-situ Actions for Conservation” showcase the impressive work being carried out by recognized zoological institutions in India.

The articles highlight the importance of scientific animal management and dedicated husbandry practices. The successful breeding record of Yellow Anacondas at Arignar Anna Zoological Park, along with the study on the performance of ratites in captivity at Shivamogga Zoo, demonstrates how careful monitoring, nutrition, and enclosure management play a vital role in sustaining healthy populations under human care. Similarly, the artificial incubation of vulture eggs represents a delicate yet crucial intervention, showing how scientific expertise and technology can directly support species recovery efforts. The documentation of internship programs at Bannerughatta Biological Park further emphasizes the value of building capacity, sharing knowledge, and nurturing the next generation of conservation professionals.

Equally important are the studies focusing on visitor engagement and conservation education. The evaluation of the “Touch & Learn” program at Sardar Patel Zoological Park and visitor feedback from Rajgir Zoo Safari highlight how zoos function not only as conservation centers but also as spaces for learning, inspiration, and awareness. By empathetic visitor experiences and adapting educational approaches, these institutions help connect people with wildlife and encourage a deeper sense of responsibility toward conservation.

Collectively, these contributions reflect innovation, dedication, and collaboration across India’s zoological community. They reinforce that ex-situ conservation is more than maintaining animals in captivity — it is about creating supportive environments where species can thrive, professionals can develop, and communities can become active partners in conservation. This compilation stands as a testament to the continued efforts of India’s zoos and allied institutions in securing species and strengthening conservation outcomes for the future.

Dr. V. Clement Ben
Member Secretary,
Central Zoo Authority



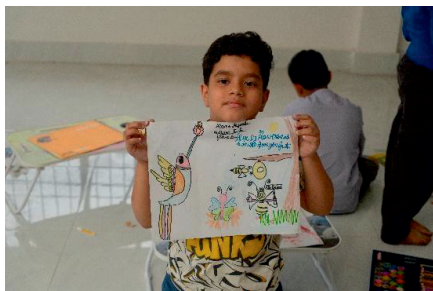
Photo Credit: Dr. Sanjay Kumar Shukla, IFS

**"WILD LIFE WEEK"
OCTOBER 02-08, 2025
CELEBRATION**



Indira Gandhi Zoological Park, Visakhapatnam

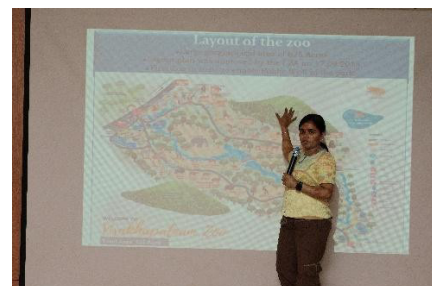
2nd October, 2025: As part of the Wildlife Week Celebrations, October 2-8, 2025 Indira Gandhi Zoological Park (IGZP) conducted Wildlife Week under the theme "Human-Animal Co-existence" on October 2, 2025. As part of the celebrations, IGZP organized a Drawing Competition for students on the topics **Pollinator Engineers: Bees, Birds and Butterflies, Marine Biodiversity and Us and Human- Elephant Conflict**. The aim of the competition is to promote awareness on wildlife conservation and education. Despite the heavy rains, students from different age groups participated with great enthusiasm.



3rd October 2025: As part of Wildlife Week celebrations (October 2–8, 2025) Indira Gandhi Zoological Park conducted the Junior Conservator Program under the theme "Human-Animal Co-existence" on 3rd October 2025 organized in collaboration with Dhan Foundation. The program aimed to nurture environmental awareness and responsibility among young minds. The children actively took part in a range of engaging sessions, from lively animal monoactions that reflected their observation skills, to interactive animal-themed group activities that encouraged teamwork and creativity. Their enthusiastic participation not only made the program enjoyable but also instilled a sense of care and conservation for wildlife.

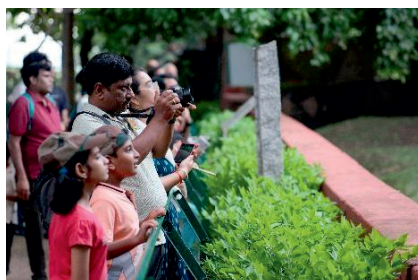


4th October 2025: As part of the Wildlife Week (October 2–8, 2025) celebrations, Indira Gandhi Zoological Park organized **World Animal Day** under the theme "**Save Animals, Save the Planet.**" The event featured enthusiastic participation from children in engaging monoaction activities, highlighting the importance of wildlife conservation. Additionally, wildlife documentaries focusing on Elephants and Conservation Breeding of Asiatic Wild Dogs were screened, creating awareness about animal protection and the crucial role of conservation efforts.



5th October 2025: As part of the Wildlife Week Celebrations, Indira Gandhi Zoological Park (IGZP) conducted a Bird Walk in collaboration with WCTRE (Wildlife Conservation Through Research and Education). The walk was guided by Mr. Vivek N. Rathod, Board Member of WCTRE who shared valuable insights about bird identification and behavior. During the walk, participants observed 154 individual birds belonging to 24 different species, including the Spotted Dove, Asian Koel, White-breasted Waterhen, Red-wattled Lapwing, Indian Grey Hornbill, White-throated Kingfisher,

Indian Roller, Rufous Treepie and Oriental Magpie-Robin. Enthusiastic participants of all age groups took part in the bird walk, making it an engaging and educational experience celebrating the beauty of avian diversity.



5th October 2025: As part of the Wildlife Week Celebrations held from October 2nd to 8th, 2025, a Photography Competition and Exhibition was inaugurated by Smt. G. Mangamma, Curator, Indira Gandhi Zoological Park (IGZP). The exhibition showcased a wide range of captivating photographs captured by participants under themes such as Endangered Species, Flora and Fauna and Family Day at the Zoo. The event was graced by Sh. B. Gopi, Assistant Curator-I; Sh. P. V. Chowdary, Assistant Curator-II; Smt. B. Bharathi, Forest Section Officer-I; along with several enthusiastic participants and visitors.



6th October 2025: As part of the Wildlife Week (October 2–8, 2025) celebrations, Indira Gandhi Zoological Park conducted a Zoo Outreach Conservation Education Programme on the theme “The Role of Zoos in Conservation and Education” addressed by Ms. B. Divya, Zoo Education Officer, IGZP at MPMP School, Santhapalem. The session aimed to create awareness among students about the significance of zoos in wildlife protection and environmental education. The program was followed by an engaging role play activity on Human–Elephant Conflict, where students effectively portrayed the challenges and solutions for harmonious coexistence between humans and elephants.



7th October 2025: Indira Gandhi Zoological Park conducted Elocution Competition on 7th October 2025 from 10:20 am to 12:00 pm at the Zoo Bioscope, IGZP. The competition focused on the topics: “Wildlife Conservation: An Investment for Future Generations” or “Technology for Wildlife: Drones, Cameras and AI in Conservation”.



Smt. G. Mangamma, Curator, Indira Gandhi Zoological Park, addressed the participants on the topic **"Wildlife Conservation: An Investment for Future Generations,"** highlighting the importance of collective responsibility in protecting biodiversity for a sustainable future. Dr. B. Bhanu, Senior Veterinarian, shared key insights on the use of Artificial Intelligence in treatment and healthcare aspects of wildlife, emphasizing how technology enhances diagnostic efficiency and animal welfare.

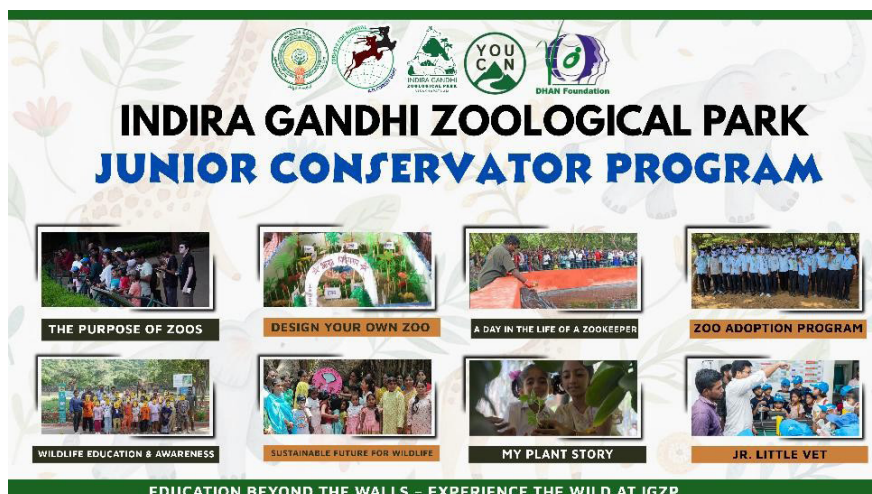
Sri P. V. Chowdary spoke on "Technology for Wildlife: Drones, Cameras, and AI in Conservation," explaining how modern tools and innovations are transforming wildlife monitoring, research, and habitat management for better conservation outcomes.



8th October 2025: Indira Gandhi Zoological Park (IGZP), in collaboration with DHAN Foundation, launched an inspiring new initiative titled "Junior Conservator Program" on the occasion of Wildlife Week celebrations, held from October 2nd to 8th, 2025, based on the theme "Human-Animal Co- Existence." This innovative program is designed to nurture young minds and instill a deep sense of responsibility towards nature and wildlife conservation, shaping them into future guardians of biodiversity.

Specially curated for school students, the program offers a blend of interactive learning sessions, hands-on experiences, and conservation-based activities that enhance their understanding of wildlife, ecosystems, and the critical role of zoos in protecting endangered species. Through engaging modules such as "A Day in the Life of a Zookeeper," "Zoos for Conservation – Guardians of the Wild" and

"Technology for Wildlife," participants gain practical insights into how modern conservation efforts operate. The initiative also emphasizes active student participation in animal adoption drives, habitat enrichment, and awareness campaigns, fostering compassion and a lifelong commitment to protecting wildlife. By combining education with action, the Junior Conservator Program aims to build a generation of environmentally conscious youth dedicated to promoting coexistence between humans and animals for a sustainable future.



Addressing the gathering, Sri. K. Balaji, IFS, Assistant Inspector General of Forests, MoEF&CC, Vijayawada highlighted the vital importance of wildlife conservation and its role in sustaining ecological balance, emphasizing that collective efforts from every citizen are crucial for preserving biodiversity. Sri B. Mohammad Diwan Mydeen, IFS, Conservator of Forests spoke about the theme “*Human–Animal Co-Existence*”, stressing that mutual respect and understanding between humans and wildlife are essential in the modern world to ensure a sustainable future.

Smt. G. Mangamma, Curator, IGZP, congratulated all the winners and participants for their active and enthusiastic involvement throughout the Wildlife Week celebrations. She appreciated the efforts of schools, teachers and students for their continued support in promoting wildlife awareness.



Indira Gandhi Zoological Park (IGZP), Visakhapatnam, successfully conducted 71st Wildlife Week Celebrations from October 2nd to 8th, 2025 on the theme “*Human–Animal Co-Existence.*” The week- long celebrations aimed to raise awareness about the importance of wildlife conservation and nature.

As part of the celebrations, IGZP organized a series of engaging and educational programs including Drawing, Elocution and Photography Competitions, which witnessed enthusiastic participation from students and nature enthusiasts. These activities provided a creative platform for participants to express their views on wildlife protection, conservation and the coexistence of humans with the animal world. These programs were organized in collaboration with YouCan, WCTRE and Dhan Foundation, whose support greatly contributed to the success of the events. All winners are awarded with momentum and merit certificate.



Date	Time	Event Name	Topic	Total number of Participants
2-10-2025 Thursday	10:00am-12:00pm	Wildlife Week Inaugural and Drawing Competition	CATEGORY 1 Topic: Pollinator Engineers: Bees, Birds and Butterflies CATEGORY 2 Topic: Marine Biodiversity and Us CATEGORY 3 Topic: Human-Elephant Conflict	55
3-10-2025 Friday	10:00am-12:00pm	Junior Conservator program	Junior Conservator program - Day 2	140
4-10-2025 Saturday	10:00am-12:00pm	International Zoo keeper's Day and World Animal Day	Animal Enrichment Challenge and Animal Monoactions Activity	160
5-10-2025 Sunday	6:00am-8:00am	Bird Walk	Explore Birds at IGZP	40
	10:00am-12:00pm	Wildlife Documentary Screening	The Gentle Giants of IGZP, Indira Gandhi Zoological Park	150
	10:00am-4:00pm	Photography Competition and Exhibition	Theme: Endangered species, Flora and Fauna & Family Day at the Zoo	25
6-10-2025 Monday	10:00am-12:00pm	Zoo Outreach Conservation Education	The role of Zoos in conservation and education	100
7-10-2025 Tuesday	10:00am-12:00pm	Elocution Competition	Wildlife Conservation: An Investment for Future Generations OR Technology for Wildlife: Drones, Cameras and AI in Conservation	45
8-10-2025 Wednesday	10:00am-12:00pm	Wildlife week Valedictory and Prize Distribution		70
			Total Number of Participants	785

Madras Crocodile Bank Trust, Chennai

Educating the visitors about reptiles



Distributing educational materials to visitors



Veermata Jijabai Bhosale Botanical Udyan & Zoo, Maharashtra

Photo Exhibition & Informative Display

1. **2nd Oct** - On the occasion of the 73rd Wildlife Week, the Mangrove Cell of the Maharashtra Forest Department and the Mangrove Foundation presented an informative desk and showcased various initiatives undertaken by the foundation, including sea turtle conservation efforts along Maharashtra's coastline, awareness about coastal tourism, and the welfare measures implemented for the local fishing communities.



Vanyavani Wildlife Festival 2025

2. **3rd Oct** - On the occasion of the 73rd Wildlife Week, the "Vanyavani Wildlife Festival 2025," organized by the Veermata Jijabai Bhosale Botanical Udyan & Zoo and Curated and co-organized by the Vanyavani Foundation, was inaugurated at the hands of Hon. Minister of Information Technology, Cultural Affairs, and Guardian Minister of Mumbai Suburban District, Adv. Ashish Shelar. The ceremony was graced by the presence of Brihanmumbai Municipal Corporation Commissioner Mr. Bhushan Gagrani, Additional Municipal Commissioner Dr. Amit Saini, and Director Zoo Dr. Sanjay Tripathi. Zoo officials, members and representative of collaborative organizations, as well as citizens, were also present on this occasion.



Deputy Municipal Commissioner of Gardens, Mr. Ajitkumar Ambi, and Zoo Director, Dr. Sanjay Tripathi, unveiled a replica of the Great Hornbill, created by the Shrushtidnyan organization, which works for the conservation of the hornbill bird. Similarly, representatives from various partner organizations participating in this festival shared details about the initiatives to be undertaken throughout the week. The event was attended by zoo officials, members and staff of participating organizations, and citizens.



3. **4th Oct - Zookeeper’s Day** - Celebrating the skilled zookeepers of Mumbai Botanical Udyan and Zoo on International Zookeeper’s Day! Your tireless dedication ensures a harmonious balance between animals and their environment. A keeper plays a vital role in providing good nutrition , maintaining hygiene of exhibits and care during the times of ill health.



Nature Trail: As part of this festival, Srushtidyan Foundation arranged a Nature Trail for differently-abled students. During this activity, the students were introduced to various plants and animals in the zoo and were educated about the importance of nature and the environment.

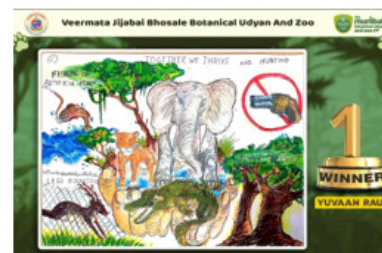


Multiple activities are undertaken

4. **5th Oct - Ecostalls:** Day four brought the festival into a lively, interactive space as Ecostalls lined the Zoo premises. Visitors explored creative products, informative displays, and hands-on activities that highlighted thoughtful choices and everyday practices.



Drawing Competition: On the occasion of the 73rd National Wildlife Week, the Veermata Jijabai Bhosale Botanical Udyan and Zoo organized, and the Vanyavani Foundation produced and co-organized the "Vanyavani Wildlife Festival 2025." As part of this festival, a drawing competition was held on the theme "Coexistence of Humans and Wildlife." School and college students participated in this competition with great enthusiasm.



Photography Competition: Veermata Jijabai Bhosale Botanical Udyan & Zoo has organized a Photography Competition as a part of Vanyavani Wildlife Festival 2025 with two categories – Mobile Photography and DSLR Camera Photography. Open to all age groups, the contest is based on the theme "Urban Wildlife," where participants can capture and submit their best shots for a chance to win cash prizes and exciting rewards.

Photography Competition (Mobile Category) Winner



Photography Competition (DSLR Category) Winner.



Nature trail and Interactive games: Shrishtidyan: Srushtidyan Foundation arranged a Nature Trail for differently-abled students. During this activity, the students were introduced to various plants and animals in the zoo and were educated about the importance of nature and the environment.



- 6th Oct - Nature Trail:** On the occasion of the 73rd National Wildlife Week, the Veermata Jijabai Bhosale Botanical Udyan and Zoo, in collaboration with the Vanyavani Foundation, organized a Nature Trail as part of the "Vanyavani Wildlife Festival 2025."



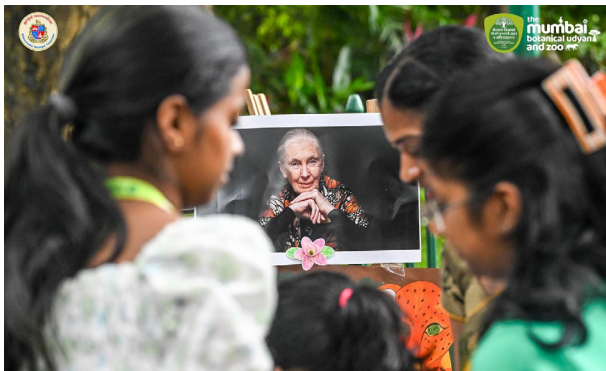
Dr. Abhishek Satam, Zoo Biologist, guided the visitors by sharing insightful information about various animals, birds, and plants, while emphasizing the importance of nature and its conservation.

Workshop: Recycling Workshop for Environmental Preservation!

A workshop was conducted for students by Dr. Smita Birkar of 5R Cycle Institute as part of the “Vanyavani Wildlife Festival 2025,” organized by Veermata Jijabai Bhosale Botanical Udyan & Zoo in collaboration with Vanyavani Foundation. As part of the festival, Dr. Smita Birkar from 5R Cycle conducted a special workshop for students. In this workshop, an exhibition of photo frames made by recycling thermocol was displayed. The children enthusiastically painted various animals and created their own unique photo frames. Under the theme “From Waste to Worth,” the participants also crafted beautiful artworks of animals and birds using discarded materials, spreading the message of living an environmentally friendly and sustainable lifestyle.



Interactive games Jane Goodall Institute: Through Jane Goodall Institute India, various creative activities, art competitions, and games related to leopards and flamingos were conducted to raise awareness about wildlife conservation among children.



6. **7th Oct - Nature trail:** The Naturalist Explore conducted a special nature trail for visitors. During this activity, the Naturalist Explorer team guided participants, sharing fascinating information about various animals, birds, and plants. Through engaging interactions, they highlighted the importance of nature and encouraged everyone to deepen their appreciation for the natural world.



7. **8th Oct - Panel discussion:** "Vanyavani Wildlife Festival 2025" festival concluded with a panel discussion on "People, Forests, and Life," featuring experts including Mrs. Kanchan Pawar, Dr. Sanjay Tripathi, Mrs. Deepti Humarskar, Dr. Nikhil Bhopale, Mr. Prashant Shinde, and Ms. Mahi Mankeshwar. Moderated by journalist Mr. Akshay Mandavkar, the discussion highlighted the coexistence of humans and wildlife and emphasized the importance of environmental awareness and conservation.



Award Function and closing ceremony: The Vanyavani Foundation presented the theatrical performance Kurma Akhyan. The play highlighted the challenges faced by turtles and the conservation efforts undertaken by the Mangrove Foundation to protect them.



"Best Employee Award" was presented in recognition of outstanding work carried out throughout the year at the zoo.

First Prize – Zoo Staff (Aura – FMS) – Mr. Nayan Nitin Kadam.

First Prize – Zoo Staff (BMC) – Mr. Sanju Devji Kharva.



Second Prize – Zoo Staff (Aura – FMS) – Mr. Darshan Dashrath Pawar.

Second Prize – Zoo Staff (BMC) – Mr. Mohammed Saif Mohammed Sajid Khan



Third Prize – Zoo Staff (Aura – FMS) – Mr. Atish Ravindra Halade.

Third Prize – Zoo Staff (BMC) – Mr. Rakesh Jadhav



MVR Snake Park & Zoo, Parassinikkadavu

MVR Snake Park & Zoo, Parassinikkadavu organized outreach activities on each day of the Wildlife Week from October 2nd to 8th to create awareness about wildlife conservation amongst the people. The list of activities conducted by the Snake Park is listed in the table below.

DAY	DATE	ACTIVITIES CONDUCTED
1	2 nd October	CLEANLINESS DRIVE Along with MVR Snake Park & Zoo, Anthoor Municipality & MVR Institute of Life Sciences & Research Studies.
2	3 rd October	FEEL THE WILD, REEL THE WILD- Reel making competition for college students on the topic Wildlife and its conservation.
3	4 th October	MRTTIKA- Clay modelling Competition and Workshop
4	5 th October	CHITRAPARNA- Nature Walk- At Aralam Wildlife Sanctuary- Butterfly Observation Walk for Zoo Ambassadors & MVR Institute of Life Science & Research Studies BSc. & MSc. Forestry Expert Talk: Butterfly Specialist and Environmentalist Shri. V. C. Balakrishnan.
5	6 th October	Wild Minds: Spot Quiz Competition for visitors.
6	7 th October	Let's speak up for the wild : Visitor's Voices & Pledge wall
7	8 th October	Interactive Session with Kerala Forest Department - DFO, Kannur and Valedictory function of Wildlife Week 2025.

DAY-1: 02/10/2025

As part of the Wildlife Week celebrations and the "Swachh Hi Seva 2025 Campaign," MVR Snake Park & Zoo, Parassinikkadavu, in collaboration with Anthoor Municipality and the MVR Institute of Life Science and Research Studies, organized a Cleanliness Drive.



DAY-2 03/10/2025

The celebrations began with an exclusive event for students of the MVR Institute of Life Science & Research — the "Feel the Wild, Reel the Wild" Reel Challenge — held on October 3, 2025. The competition encouraged participants to capture the beauty of wildlife and the significance of conservation through creative short reels. The event aimed to inspire young minds to express their storytelling skills and passion for nature while spreading awareness about the wonders of wildlife.



DAY-3: 04/10/2025

As part of the ongoing Wildlife Week 2025 celebrations, the MVR Snake Park & Zoo, Parassinikkadavu, organized a unique event titled "Mrttika – Clay Modelling Competition and Workshop" on Saturday, October 4. The programme was inaugurated by Sculptor Chithran Kunjimangalam and presided over by Prof. E. Kunhiraman (Director of MVR Snake Park & Zoo).



DAY- 4: 05/10/2025

The event saw enthusiastic participation and was part of the park's larger Wildlife Week 2025 celebration, held from October 2 to 8, aimed at promoting wildlife conservation and creative learning among children.



MVR Snake Park & Zoo, Parassinikkadavu, in collaboration with the MVR Institute of Life Science & Research Studies and the Aralam Wildlife Sanctuary, organized a peaceful nature walk titled "Chithraparna" at the scenic Aralam Wildlife Sanctuary on October 5 Sunday.



The event, themed "Witnessing the Poetry of Wings," aimed to raise awareness about butterfly conservation and the importance of protecting natural habitats. Participants had the opportunity to observe and learn about various butterfly species in their natural environment while enjoying the beauty of the sanctuary.



The session was led by V.C. Balakrishnan, noted butterfly specialist and environmentalist, who shared valuable insights on butterfly behavior, ecology, and conservation techniques.

Sijesh K.V.(Beat Forest Officer) Sushanth (Watcher),Sathyanadhan C.V.They helped us to explore the forest and learn about the wildlife and animals.



A valedictory session was held at the conclusion of the walk. The function was presided over by Prof. E. Kunhiraman, [Director of MVR Snake Park & Zoo]. The event was inaugurated by M. Rajan, [Section Officer, Aralam Wildlife Sanctuary].

V.C. Balakrishnan (Butterfly Specialist and Environmentalist), Rhueena T.V. (Head of the Department of Forestry, MVR Life Science College), Dr. Anju Mohan (Veterinary Officer, MVR Snake Park & Zoo), and Amaljith A.T. (Curator, MVR Snake Park & Zoo) delivered felicitations and addressed the gathering.

Ms.Della (Postgraduate-Forestry Student of (MVR Institute of Life Science & Research studies) and Ms. Anjana (Undergraduate Student of (MVR Institute of Life Science & Research studies) shared their feedback on the program, expressing appreciation for the enriching and educational experience.



The Wildlife Week celebrations at MVR Snake Park & Zoo and its associated institutions continue to inspire public participation through creative and educational initiatives promoting biodiversity conservation and environmental awareness.

DAY- 5: 06/10/2025



Continuing the celebration, the zoo hosted the **"Wild Minds" Spot Quiz Competition** on October 6, 2025, from 10:00 AM to 1:00 PM. The interactive quiz tested participants' knowledge of wildlife, biodiversity, and environmental conservation. The event received enthusiastic participation from students and nature lovers, creating a lively platform for learning and sharing insights about India's diverse wildlife heritage.

DAY- 6 07/10/2025



Adding a reflective and participatory touch to the week, the **"Let's Speak Up for the Wild!"** event was held on October 7, 2025, featuring **Visitors' Voice** and a **Pledge Wall**. Visitors were invited to share their thoughts, quotes, and commitments toward wildlife conservation. Through heartfelt messages and pledges, participants expressed their dedication to protecting nature and promoting coexistence with wildlife. The initiative strengthened community engagement and highlighted the importance of individual responsibility in conservation.

The Wildlife Week 2025 celebrations at MVR Snake Park & Zoo successfully combined creativity, education, and public involvement. With programs like the Reel Challenge, Wild Minds Quiz, and Pledge Wall, the event series reflected the park's ongoing efforts to raise environmental awareness and inspire future generations to take action for wildlife protection.

DAY-7 08/10/2025

MVR Snake Park & Zoo conducted an Interactive Session with Kerala Forest Department. Kannur Divisional Forest Officer, Shri. S. Vysakh IFS & Range Forest Officer of Taliparamba range, Shri. Sanoopkrishna P. V. participated in the session. Valedictory function of the Wildlife Week celebrations was inaugurated by Mr. S. Vaishakh, IFS, [Divisional Forest Officer, Kannur]. In his address, he emphasized the importance of protecting local wildlife and the need to instill this awareness from a young age. The function was presided over by Dr. Anju Mohan, [Veterinary Officer, MVR Snake Park & Zoo].

Mr. P. V. Sanoop Krishnan, [Range Forest Officer, Thaliparamba], Dr. Sangeeth K. P, [Principal, MVR Institute of Life Science and Research Studies], Mrs. T. V. Ruheena, [Head of the Forestry Department] and Mr. Amaljith AT [Curator, MVR Snake Park & Zoo], Mr. Sudhakaran TV [CS, MVR Snake Park & Zoo] Mr. Aghosh P [Biologist, MVR Snake Park & Zoo], offered felicitations and spoke on the occasion.

As part of the event, prizes were distributed to the winners of Snapzoot 2k25 Monsoon Zoo Photography Contest. The overall winner, Mr. Prayoj M. K received a cash prize and memento from the chief guest. Prizes were also distributed to the winners of the Reels competition. Additionally, a wildlife-themed quiz was organized for visitors during the celebration.



Mini Zoo, Miao, Arunachal Pradesh



Felicitation of Quiz competition winners at Mini Zoo, Miao



Felicitation of Quiz competition winners



Free entry to Visitors to mark the occasion of 71st Wildlife Week



Felicitation of Mrs. Mibom Singpho for rescuing Slow Loris



Felicitation of Hog Deer rescuer Mr. Bimal Chetry



Felicitation of Mrs. Mibom Singpho for rescuing Slow Loris



Skit & Documentary show to the locals



Felicitation of Animal Rescuers

SECURING SPECIES: EX-SITU ACTIONS FOR CONSERVATION



Breeding Record of Yellow Anaconda (*Eunectes notaeus*) at Arignar Anna Zoological Park, Vandalur, Chennai

S.R. Chandramouli, G. Kamaraj and T. Ritto Cyriac

Arignar Anna Zoological Park, Vandalur, Chennai

Abstract

This article presents information on captive breeding of yellow anacondas (*Eunectes notaeus*) documented at the Arignar Anna Zoological Park, Vandalur, Tamil Nadu. Four instances of successful breeding and parturition have been documented since their initial acquisition in 2020. The number of young ones born during each of the instances and their subsequent survival success were documented. This reveals, that of 37 births documented, only eight individuals have died, showing a significantly positive trend in the population being maintained. Individuals that turn out to be surplus to the requisite stock at our zoo are being exchanged with other Indian zoos, some of which have been accomplished and some, in progress.

Keywords: Captive breeding, ovoviviparous, carrying capacity, animal exchange, survival success.

Introduction

Captive breeding serves as one of the major goals of ex-situ conservation of organisms in facilities such as Zoological Parks and breeding centres. One such major

centre in the southern Indian region, specializing in ex-situ conservation of animals by means of captive breeding is the Arignar Anna Zoological Park (AAZP). AAZP is one of the four large zoos in the southern Indian region and is spread across an area of 602 Ha, which also includes a rescue and rehabilitation centre. AAZP is home to more than 135 species of organisms from around the world which includes endangered, vulnerable and threatened species not just from India but also from other parts of the world. Currently, the zoo houses about 42 exotic species, of which nine are reptiles, which include two species of snakes. One of the prominent species, serving as a major attraction at the zoo is the yellow anaconda (*Eunectes notaeus*). Yellow anacondas are ovoviviparous snakes, that give birth to live young ones. Naturally, they occur in parts of South America across countries like Brazil, Bolivia, Paraguay and Argentina (Uetz et al., 2026). In India, it was initially brought into captive facility by the Madras Crocodile Bank Trust, Mamallapuram, Chennai. Information on acquisition and captive breeding of yellow anacondas at the Arignar Anna Zoological Park is detailed below.

Table 1: Acquisition, Births, deaths and disposal of Yellow Anaconda (*Eunectes notaeus*) at AAZP

	2020	2021	2022	2023	2024	2025	Total
Acquisition	8	0	0	0	0	0	8
Birth	0	0	7	0	20	10	37
Death	0	1	0	1	6	0	8
Disposal	0	0	0	0	3	0	3

Methods

Yellow anacondas are ovoviviparous snakes that give birth to live young ones after gestation. An initial stock of four males and four female yellow anacondas (4:4:0:8) were obtained through animal exchange program with the Madras Crocodile Bank, Chennai in December 2020. This was the first time this species was brought into the collection of animals at the AAZP. A new set of twin enclosures, measuring 94 sq. m. each, totaling to 188 sq. m. was constructed near the serpentarium in the reptiles section of the Zoo.

For housing these primarily aquatic snakes, the enclosure was designed with sufficient water bodies shaped in the form of a deep depression located near the visitors' view point of the enclosure. Also, the enclosure is furnished with rough, rocky surfaces to facilitate ecdysis in the

snakes periodically. The enclosures are also enriched with sufficient greenery inside and have been provided with water sprinklers on the ceiling. During hot weathers in summers, the sprinklers are turned on periodically, to combat heat stress. Their enclosures are also equipped with a digital thermo-hygrometer that constantly monitors the enclosure's room temperature. The snakes are fed with chicks once every week on Tuesdays.

Results:

One of the eight individuals brought initially died in April 2021. The first episode of captive births took place on 2 Oct 2022 after nearly two years (about 22 months) since the snakes were brought to the zoo. A total of four juveniles were born in the first instance. Soon after, on 28 Nov 2022, another batch of three juveniles were born, totaling to seven young ones in the first year of

captive breeding. Among these, one of the juveniles could not survive for long and died soon after birth on 29 Jan 2023. Three of these seven young ones were exchanged with the Chennai Snake Park for seven numbers of Green Iguanas (*Iguana iguana*).

The third instance of births took place two years later, in 2024. A total of nine juveniles were born on 10 July 2024. On the very next day, on 11 July 2024, a total of eleven juvenile yellow anacondas were born. Of the above two batches of juveniles born at the zoo, six young ones died between Sep 2024 and Mar 2025, leaving the total number of snakes at 2:3:19:24. Subsequently, on 14 July 2025 a total of ten juveniles were born, increasing the total number of snakes to 35. Two more juveniles died subsequently, bringing the total population at the zoo to 32.

The young ones, upon birth are separated from the mother and maintained in separate containers until their survival is ensured. They are fed with young chicks and are shifted to trays during feeding, so as to ensure that each of the juvenile has taken feed every week. The water in the pools within the enclosure is also changed periodically to ensure that it is clean and free from impurities. The top soil in the enclosure is treated / changed whenever necessary to ensure that the space is free from ectoparasites such as ticks. Thus, the captive breeding of yellow anacondas at Arignar Anna Zoological Park has been successful, resulting in a total of 37 births and eight deaths, with three juveniles being exchanged. Upcoming animal exchange programmes have been proposed to dispose the yellow anacondas that are in surplus for other species of animals.



Fig. 1: Yellow anacondas (*Eunectes notaeus*) mating at the enclosure of AAZP

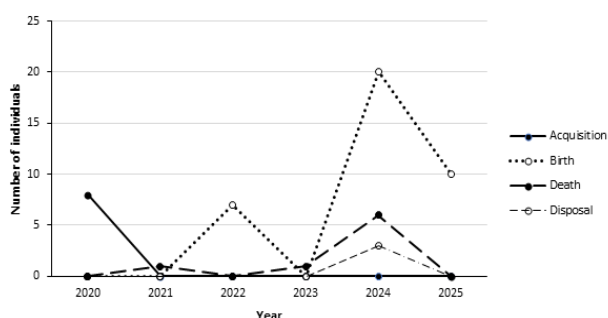


Table 2: Trends of births, deaths, acquisition and disposal of yellow anacondas (*Eunectes notaeus*) at AAZP

Discussion:

Yellow anacondas have been bred successfully in captive conditions in several ex-situ centers (ex: Holmstorm, 1981; Crocworld, 2026) and have been known to be managed commercially in a sustainable manner in the western countries (Micucci & Waller, 2007). In India, apart from the Madras Crocodile Bank, AAZP is the only zoo that has had successful instances of captive breeding of Yellow Anacondas. This in turn, has led to the introduction of this species into the animal collection plan and consequently to the list of reptile species displayed in several Indian Zoos such as the Chennai Snake Park and Sakkarbaug Zoo, Gujarat (exchange proposal approved by the CZA). Additionally, exchange programmes have been proposed with other Indian zoos such as Trissur Zoo and Tiruvananthapuram Zoo in Kerala, India.



Fig. 2: Juvenile yellow anacondas (*Eunectes notaeus*) born at Arignar Anna Zoological Park

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Internship as a Tool for Enhancing Ex-Situ Action for Conservation at Bannerughatta Biological Park

A V Surya Sen, IFS, Executive Director, Amala M Anil, Education Officer

Bannerughatta Biological Park, Bengaluru

Bannerughatta Biological Park (BBP) is located about 22 kilometers from Bengaluru city and is the northern most tip of the Mysuru Elephant Reserve, an ecologically significant area. With an average of 2 million visitors to the park annually, around 2000 animals belonging to 95 species of birds, mammals and reptiles are housed within the zoo, safari, butterfly park and rescue centre. As per the National Zoo Policy 1998, it is mandatory for Zoos in India to contribute towards the ex-situ conservation efforts of the nation, through education, research, conservation breeding as well as rescue and rehabilitation.

Accordingly, Bannerughatta Biological Park is not only a centre for ex-situ conservation of flora and fauna, but also dedicated for wildlife education and conservation awareness to bridge the gap between biodiversity and people from all walks of life. The park conducts various awareness activities aimed at educating visitors and the local community about the importance of biodiversity, wildlife protection and sustainable environmental practices.

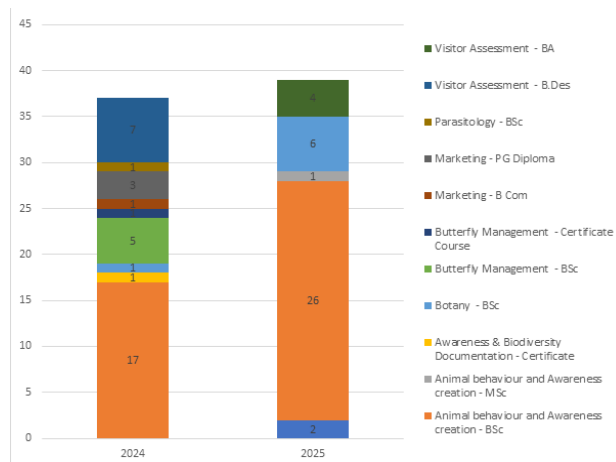
These activities include celebrations of various animal and nature themed days, guided nature walks, interactive workshops and educational programs tailored for students and nature enthusiasts within and around the park. Through these initiatives, Bannerughatta Biological Park strives to foster a deeper understanding and respect for wildlife, encouraging active participation in conservation efforts. Further, Bannerughatta Biological Park is a member of the International Zoo Educators Association (IZEA) to enhance the education activities in par with zoos worldwide.

As per the Zoo Education Master Plan for Indian Zoos published by Central Zoo Authority (CZA) and Centre for Environmental Education (CEE), the value of volunteers and interns have been highlighted to support education activities of the park as most zoos have limited human resources to fulfil this vital role. Zoo education can be enhanced with volunteers and interns with diverse experience in their respective field but with a common goal towards wildlife conservation. Awareness creation is only one of the ways for species conservation however it is vital to understand the impact these education activities have on their respective audience.



Internships are offered to school, college and university students to gain hands on experience in relevant skills through relevant activities which contribute towards assessing zoo management through animal behavior, enclosure utilization, visitor interviews to assess their expectations and experience to improve awareness activities. The students get an insight about the functioning and significance of the park towards ex-situ conservation along with activities and projects during the internship through which they can contribute their skills to enhance the organization's mission.

With regards to the internships offered, apart from veterinary interns, 37 students in 2024 and 39 students in 2025 availed internship at BBP. Majority of the students were from Bachelor of Science (BSc) courses in both years with participation starting from 12th Grade to Master of Science (MSc) level. Students from Commerce, Design, Arts also took part in the internship with along with certificate course in naturalist training and butterfly breeding. The main fields for the internship include animal behavior, awareness creation, biodiversity documentation, butterfly management, botany, marketing, visitor assessment and parasitology. In the table below, it is evident that most 12th grade, BSc and MSc interns opt for animal behavior and awareness creation. Other BSc students opted for Botany or Butterfly Management and Parasitology. PG Diploma in Forest Management students and B Com students focused on marketing strategies. Further (Bachelor of Arts) BA and B Des (Bachelor of Design) focused on visitor assessment by providing insight of visitor experience in their respective fields to formulate an effective solution.



Graph 1: Summarizing internships conducted in 2024 and 2025, highlighting the internship fields selected by students based on their education level and streams

Education Level and stream	2024	2025
12th grade		2
B Com	1	
B.Des	7	
BA		4
BSc	24	32
Certificate Course	2	
MSc		1
PG Diploma	3	
Grand Total	37	39

Table 1: Number of interns in 2024 and 2025 as per their education level and stream.

Year	Internship Field						
	Animal behaviour and Awareness creation	Awareness & Biodiversity Documentation	Botany	Butterfly Management	Marketing	Parasitology	Visitor Assessment
2024	17	1	1	6	4	1	7
2025	29		6				4
Total	46	1	7	6	4	1	11

Table 2: Selection of internship fields by interns in 2024 and 2025.

One such impactful internship on visitor assessment was conducted by students in Bachelor of Arts with combinations including Economics, Political Science and History. Their main objective was to understand visitor behavior through interviews to understand their experience of visiting the park along with knowledge on wildlife and Wild Life (Protection) Act, 1972.

Since Bannerghatta Biological Park is located in a dedicated, earmarked area within the Bannerghatta National Park (BNP), we tried to assess if visitors knew the difference between the two and it was evident that 70% of visitors still considered BBP as BNP. This difference is vital for visitors to understand ex-situ and in-situ conservation efforts. Understanding visitor perspective of the park's function plays a vital role in management. 40% believed that it was a place for entertainment followed by 22% mentioning rescue, 20% saying education about nature and wildlife, 10% for conservation breeding of wildlife and 8% towards research. This shows that the zoos role needs to be enhanced through more vigorous awareness during the visit and the role in rescue is well known. Conservation breeding and research need to be highlighted further through in-reach and outreach activities.

Only 18% agreed that they knew at least one wildlife or animal law. With regards to interaction with captive



Wildlife Pledge to create awareness on the fundamental duties as per Article 51 A (g) of the Constitution of India.



Prey models paper mache enrichment created by Interns for Leopard Day enrichment.



Hands on training in butterfly park for different life stages of butterflies.



Assessment of internship findings by BBP Officers to implement suitable measures.

wildlife, 56% respondents expressed their willingness to touch them and 42% wanted to feed them, however 88% agreed that animal rides were not allowed. 48% shared that it was illegal to tease and feed zoo animals, 32% believed that it was illegal to litter in a zoo and 86% knew that wild animals could not be kept as pets. 96% believed that BBP was protecting animals and the environment. 94% supporting the fact that BBP was required as a conservation centre for wildlife.

Further, visitors were questioned about their most and least favorite animals. Tiger, Lion and Deer were among the most liked whereas Hippopotamus, Bear and Snakes were the least liked. Further with regards to facts they were relatively well aware about Giraffes and King Cobra but less about Great Indian Hornbill, Emu and Hanuman langur, which are not always in the limelight.

For the zoo to support the national efforts in conservation, these visitor options highlight the limited knowledge that visitors have about biodiversity and laws. During the various animal days and awareness sessions conducted by BBP Officials, the threats to species along with the laws protecting them as well as the fundamental duty of every Indian citizen towards protecting and improving our natural resources as per Article 51 A(g) of the Constitution of India. Section 38 J of the Wild Life (Protection) Act, 1972 highlighting the prohibition of teasing, feeding of wildlife and litter the zoo grounds is also highlighted in awareness activities. Further efforts are made to create awareness about less known animals through our social media pages, with audio visually appealing content which connects to a wide range of audiences. Further the zoo has adopted a strict Plastic Checking action to impart the knowledge of not littering in the zoo grounds and as a preventive measure to avoid single use plastic, along with sale of reusable glass water bottles as a green alternative.

With regards to visitor experience, Bachelor of Design students from the R V School of Design could assess the visitor behavior and conduct market research to suggest ways to enhance the educative experience of visitors by assessing parent-child mindset in a zoo and recommending age related educative kits and experiences. Further, assessing the most suitable wayfinding and informative boards in the zoo to provide ease of access along with designing a zoo app which can be used for education and way finding provides valuable information which can be readily implemented. With regards to marketing, interns have also conducted surveys, market research to provide a strategy for social media management and to connect to suitable vendors for purchase at the zoo retail shop.

Further internships such as behavioural studies, enhance the management through documentation of ethograms of specific species, understanding their activity budget and enclosure utilization which helps to assess future enrichment programs. Interns also get involved in awareness programs and enrichment making to directly contribute towards the parks efforts towards conservation and welfare. In regards to group integration, understanding group dynamics is vital to mix different groups of the same species, housed in different enclosure. Hence a study on the determination of social hierarchy in a group of juvenile Hamadryas baboon provides an insight into the social interaction amongst the individuals to further determine future plans to retain the socially influencing individuals which bind the group together with a possibility of moving less socially integrated individuals into a different, same species group. Further, with the enhancement of zoo enclosures as per species specific requirements, comparison of behavioral repertoire and enclosure

utilization of Gharials in traditional and modern enclosures provides a valuable database of the welfare of the animals. Bannerughatta Biological Park's Butterfly Park provides an opportunity for students from Botany and Zoology background to get hands on experience through supporting the management of different life stages of butterflies in dedicated labs and the host plant garden as well as monitor the populations, provide suggestions to enhance the management through creation of SOP (Standard Operating Procedure).

Internships are a value-added resource for zoos to enhance the management and work towards conservation of biodiversity by understanding the visitor mindset, expectations as well as ensuring that the zoos objective towards conservation is satisfied. It is vital for management roles in different fields within a zoo, to come together to predetermine areas of research which can be accordingly assigned to interns who wish to gain relevant skills hence acting as a symbiotic action for the zoo and intern.

Breeding Performance of Ratites in Captivity: Animal Care, Health and Husbandry Insights from the Shivamogga Zoo, Karnataka, India

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Dr. Muralimanohar, Veterinary Officer, Shivmogga Zoo, Karnataka

At Shivmogga Zoo in Karnataka, a quiet concern had lingered for years. The emus had stopped breeding. The zoo houses six emus (*Dromaius novaehollandiae*). Four females and two males, all over ten years of age and biologically capable of reproduction. In their early years at the zoo, they laid eggs, but none hatched. Gradually, even egg-laying ceased. For over fourteen years, no successful hatch was recorded. The enclosure was active, the birds were healthy, yet reproduction remained absent.

In contrast, the ostriches (*Struthio camelus*) continued to lay eggs each season with varying levels of success. The greater rheas (*Rhea americana*), a newer addition, have entered their first breeding season in captivity as they reached maturity.

- Captive breeding in ratites is often considered routine management, yet reproduction in behaviourally complex long lived birds is a key welfare indicator. When breeding fails for extended periods, it signals underlying social, environmental, or physiological constraints.
- A month-long structured assessment combined focal and scan behavioural observations with enclosure evaluation, dietary review and breeding record analysis. Although emus, ostriches, and rheas share ecological similarities as large, flightless southern hemisphere birds, the constraint appeared species-specific.
- Upon behavioural studies, it was confirmed that the issue was not biological incapacity but predominantly social constraint interacting with environmental cues. The six emus formed two unstable clusters: one male with two dominant females, another male with one female, and one socially isolated female [Table 1]. Because emus are seasonally monogamous and require stable pair bonds—initiated by female mate choice—this unstable grouping likely constrained pair formation and suppressed reproduction.
- The skewed sex ratio—four females to two males—created sustained social constraint. Dominant females displaced others, leading to mate-guarding, aggression and instability. Energy was diverted

from courtship and nesting toward vigilance and conflict avoidance. Management was further complicated by the lack of sexual dimorphism in the Emu, making accurate identification and breeding records difficult without proper tagging.

- Environmentally, reproduction depends on shortening photoperiod, but unpredictable rainfall and prolonged summers in India may disrupt associated seasonal cues. Courtship was observed, indicating intact physiology; however, without stable pairing and reduced stress, reproductive readiness did not result in successful breeding.
- The Ostrich showed encouraging reproductive performance during the recent breeding season. A total of 18 eggs were laid, of which 12 hatched successfully under natural incubation by parent birds, without artificial intervention.

Table 1: Sex Composition Among Emus and Pair Formation.

Total Number of Emus	6
Number of females	4
Number of males	2
Number of pairs formed	2
Pair number 1 individuals	2 Females 1 Male
Pair number 2 individuals	1 Female + 1 Male
Number of Individuals without a mate	1 (Female)
Sex ratio (Female: Male)	4:2

Following the assessment, three corrective measures were recommended for the Emu husbandry management:

1. Structured Pair Separation:

Partition the enclosure into: (i) two females with one male, and (ii) one male with one female, managing the remaining sole female separately. This would reduce aggression and support stable pair formation.

2. Habitat Modification:

Reduce excess tree cover to create balanced shade and sunlight for thermoregulation, ensuring consistent access to clean water in each section.

3. Sex Ratio Correction:

Acquire additional males to balance the ratio, potentially from other zoos.



Rhea Eggs



Emu Eggs

4. Individual Identification:

All emus should be tagged with individual identification numbers to improve accuracy in record-keeping, breeding tracking, and medical management.

As daylight shortened in December and January, the response was unmistakable. After more than fourteen years without a single successful season, the Emu laid 32 eggs this winter, of which 10 successfully hatched—marking a historic reproductive breakthrough. Alongside them, the Ostrich continued its consistent seasonal laying, while the Greater Rhea, entered its first breeding season in captivity, also produced eggs successfully.

RESULTS

Strengthening precision in record-keeping, breeding evaluation, and medical management. What followed was not immediate—but it was transformative.

This success was not accidental. It emerged from systematic behavioural assessment, improved nutritional management, welfare-oriented enclosure modifications, and evidence-based husbandry refinement.

Captive breeding rarely succeeds by chance. Animals communicate long before results are visible—through subtle shifts in spacing, dominance, feeding behaviour, and courtship displays. At Shivmogga Zoo, the emus were never reproductively incapable; they were responding to imbalance. Once social tension was reduced, feeding stress minimized, environmental cues aligned, and stable pair bonds supported, their biological capacity expressed itself naturally.

This case reinforces a core principle of ex-situ conservation: reproductive performance is not merely a measure of output—it is a reflection of welfare, compatibility, nutrition, and adaptive management.

And sometimes, the revival of breeding does not begin with advanced technology—it begins with careful observation, thoughtful feeding, environmental balance, and the willingness to truly listen to behaviour.

Securing Species: Ex-Situ Actions for Conservation

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GZRRC-VANTARA, Jamnagar

Ex-situ conservation encompasses the scientific management of species outside their natural habitats with the objective of preventing extinction, maintaining genetic diversity, and supporting population recovery. In India, zoological institutions are regulated by the Central Zoo Authority, which over the years have transitioned from traditional display facilities to integrated conservation centres that actively contribute to biodiversity preservation. These institutions operate with national and global conservation frameworks established by organisations such as the Ministry of Environment, Forest and Climate Change, Government of India, International Union for Conservation of Nature, CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), etc. ensuring that ex-situ interventions are aligned with international standards and complement in-situ conservation strategies.

Contemporary ex-situ approaches in India are multifaceted and include conservation breeding programmes, rescue and rehabilitation of displaced wildlife, genetic resource banking, and reintroduction initiatives. Collectively, these interventions function as a critical safety net for species threatened by habitat loss, illegal wildlife trade, and human-wildlife conflict, while also generating scientific knowledge that supports long-term conservation planning. Zoological institutions across India play a central role in maintaining assurance populations of threatened species through coordinated breeding and management programmes. Notable examples include the conservation of the Asiatic lion at Sakkarbaug Zoological Garden, Red panda breeding initiatives at Padmaja Naidu Himalayan Zoological Park, Indian spotted chevrotain breeding programme at Nehru Zoological Park, Red-crowned Roofed Turtle and Northern River Terrapin at Madras Crocodile Bank Trust, Breeding of various species of South Asian Vultures at Jatayu Conservation and Breeding Centre, Pygmy hog breeding at the Pygmy Hog Breeding Centre in Basistha, Guwahati, Pangolins and Gharials at Nandankanan Zoological Park, Bhubaneswar, One-horned rhinoceros at Sanjay Gandhi Biological Park, Patna etc. These programmes are supported by structured genetic management systems, including studbooks and species management plans, which ensure demographic stability and minimize inbreeding across institutions.

Ex-situ conservation efforts are further strengthened by advances in genetic and reproductive sciences. Institutions such as the Laboratory for the Conservation of Endangered Species, Centre for Cellular and Molecular Biology play a pivotal role in supporting

conservation breeding through molecular genetics, assisted reproductive technologies, and biobanking. The development of “frozen zoo” facilities such as those at Padmaja Naidu Himalayan Zoological Park in collaboration with CCMB enables long-term preservation of genetic material, including DNA, gametes, and tissues, thereby safeguarding evolutionary potential and facilitating future species recovery efforts.

Within this national framework, the Greens Zoological Rescue and Rehabilitation Centre (GZRRC) represents a distinctive model of ex-situ conservation, characterized by its strong emphasis on rescue-driven intake, large-scale rehabilitation, and long-term management of confiscated and displaced wildlife. Unlike conventional zoos, such rescue-oriented facilities contribute not only to population management but also to addressing the immediate impacts of anthropogenic pressures on wildlife. Building on this national momentum, GZRRC is well-positioned to contribute to emerging genetic conservation initiatives through its extensive and taxonomically diverse rescued populations. Such facilities have the potential to integrate rehabilitation, genetic resource banking, and conservation breeding into a unified framework, enhancing their role in long-term species security.

Rescue and Rehabilitation: Foundation of Ex-Situ Conservation

A defining component of ex-situ conservation in India is the structured rescue and rehabilitation of wildlife affected by anthropogenic pressures. Animals admitted into zoological facilities typically originate from illegal wildlife trade, human-wildlife conflict situations, habitat degradation, or institutional transfers arising from resource constraints. Upon intake, individuals undergo systematic evaluation protocols, including legal documentation, quarantine, disease screening, and clinical assessment, ensuring both individual welfare and population-level biosecurity. Rehabilitation strategies are tailored to species-specific ecological and behavioural requirements and include veterinary care, nutritional stabilization, environmental enrichment, and behavioural conditioning aimed at reducing stress and minimizing human imprinting.

In this context, GZRRC functions as a major wild animal rescue facility, equipped to handle large-scale intake and complex cases involving multiple taxa. Its integrated approach combining critical care, behavioural recovery, and long-term welfare management illustrates the

evolving role of rescue centres as essential components of conservation infrastructure rather than merely holding facilities. Consequently, ex-situ institutions must adopt dual management pathways, wherein animals are either prepared for reintroduction or incorporated into lifetime care and conservation breeding programmes. This approach ensures optimal utilization of rescued individuals within broader conservation objectives.

Conservation Breeding and Genetic Management

Conservation breeding programmes in Indian zoos are designed to maintain genetically viable populations of threatened species through scientifically coordinated management. These programmes rely on studbooks, demographic analyses, and inter-institutional transfers guided by the Central Zoo Authority, ensuring long-term population sustainability and minimizing inbreeding. Advances in conservation genetics have significantly strengthened these efforts through the integration of molecular tools, genome resource banking, and assisted reproductive technologies. Institutions such as the Laboratory for the Conservation of Endangered Species and the Centre for Cellular and Molecular Biology play a pivotal role in this domain, supporting species recovery through genetic characterization, biobanking, and reproductive interventions.

A key development within ex-situ conservation is the establishment of “frozen zoo” facilities, which enable the long-term preservation of genetic material including DNA, gametes, embryos, and somatic tissues under ultra-low temperature conditions. In India, such initiatives have already been operationalized at Padmaja Naidu Himalayan Zoological Park in collaboration with CCMB, representing a significant advancement in safeguarding genetic diversity beyond living populations.

Building upon this national framework, the Greens Zoological Rescue and Rehabilitation Centre (GZRRC) is uniquely positioned to develop one of the most comprehensive integrated frozen zoo and genetic resource banking facilities in the country. Given its access to a large and taxonomically diverse pool of rescued and confiscated wildlife often representing multiple geographic lineages GZRRC offers a rare opportunity to capture and preserve genetic diversity that may otherwise be irretrievably lost from wild populations.

The establishment of a frozen zoo at GZRRC would enable:

- Long-term genetic archiving of threatened and confiscated species
- Support for assisted reproductive technologies, including artificial insemination and in vitro fertilization

- Genetic rescue of small or fragmented populations through future reintroduction of genetic material
- Integration with national and global biobanking networks, strengthening collaborative conservation efforts

Importantly, the integration of genetic resource banking with ongoing rescue, rehabilitation, and conservation breeding programmes at GZRRC represents a holistic conservation model, where immediate animal welfare interventions are directly linked to long-term species survival strategies. Such an approach not only enhances the conservation value of rescued individuals but also positions GZRRC as a potential national hub for genetic conservation, complementing existing institutional capacities and contributing to the development of a coordinated, forward-looking ex-situ conservation framework in India.

Reintroduction and Release: Bridging Ex-Situ and In-Situ Conservation

Reintroduction and release programmes represent a critical interface between ex-situ and in-situ conservation. These initiatives aim to restore viable populations in natural habitats through the strategic release of rehabilitated or captive-bred individuals.

Successful reintroduction requires a rigorous, science-based approach involving:

- Habitat suitability assessments
- Identification and mitigation of threats such as poaching and habitat degradation
- Disease risk analysis
- Behavioural evaluation of candidate individuals
- Post-release monitoring using telemetry and field-based surveys

Zoological institutions contribute to this process through pre-release conditioning, health certification, and fitness assessments. Facilities such as GZRRC play an important role in preparing animals for release by ensuring that individuals exhibit appropriate behavioural competencies and physiological readiness. However, reintroduction is inherently selective and context dependent. Many rescued animals—particularly those that are habituated to humans or have sustained irreversible injuries—may not be suitable for release. In such cases, their continued care within ex-situ systems contributes to conservation through education, research, and genetic management.

Research, Education, and Institutional Contributions

Beyond direct conservation interventions, zoological institutions serve as important centres for scientific research, education, and capacity building. Zoological

facilities in India and globally contribute significantly to advancements in animal health, husbandry practices, and conservation awareness. By generating data on species biology, disease dynamics, nutrition, and behaviour, these institutions provide critical inputs for species recovery programmes and adaptive management strategies. GZRRC, by virtue of managing a high diversity and volume of rescued wildlife, offers valuable insights into real-world conservation challenges, particularly those arising from wildlife trade and human–wildlife interactions.

Challenges and Future Directions

Despite their expanding role, ex-situ conservation programmes face several inherent challenges. Genetic bottlenecks and the risk of inbreeding remain significant concerns, particularly in small or isolated populations. Behavioural modifications associated with captivity may reduce the success of reintroduction efforts, while the long-term maintenance of high-standard facilities requires substantial financial, technical, and human resources. Additionally, the effectiveness of ex-situ interventions is ultimately dependent on conditions in the wild. Persistent threats such as habitat loss, climate change, and illegal wildlife trade can limit the success of

reintroduction programmes and necessitate sustained conservation efforts beyond institutional boundaries. Addressing these challenges requires stronger integration between ex-situ and in-situ strategies, enhanced genetic and ecological planning, and continued collaboration among regulatory bodies and research institutions.

Conclusion

Ex-situ conservation has emerged as a critical component of modern biodiversity conservation, functioning as both a safeguard against species loss and a platform for scientific intervention. Through integrated approaches encompassing rescue, rehabilitation, conservation breeding, and reintroduction, zoological institutions contribute significantly to species recovery and ecosystem resilience.

Facilities such as GZRRC exemplify the evolving paradigm of ex-situ conservation, where large-scale rescue operations are seamlessly integrated with long-term conservation objectives. Moving forward, the continued success of these efforts will depend on their ability to remain scientifically robust, policy-aligned, and closely linked with in-situ conservation initiatives, ensuring a holistic and sustainable approach to securing species for the future.

From Egg to Chick: Strengthening Vulture Recovery through Artificial Incubation

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Introduction

Vultures are highly efficient scavengers that play a vital role in maintaining ecological balance by rapidly removing animal carcasses. This function is especially important in India, where livestock numbers are high and carcass disposal systems are limited. By consuming carcasses quickly, vultures help reduce the spread of diseases among humans, livestock, and wildlife. In their absence, carcasses persist longer, leading to an increase in scavengers like feral dogs and rats, which are associated with diseases such as rabies and anthrax. Thus, vultures are crucial for both ecosystem health and public sanitation. India is home to nine species of vultures, including several belonging to the genus *Gyps*. Until the early 1990s, species such as the White-rumped Vulture and Long-billed Vulture were highly abundant. However, their populations declined drastically by over 95–99% within a decade, marking one of the fastest recorded declines in bird populations. Research identified the veterinary drug diclofenac as the primary cause, which leads to fatal kidney failure in vultures feeding on contaminated carcasses. Even small levels of contamination were enough to cause widespread mortality.

The decline of vultures has led to serious ecological and socio-economic consequences. Carcass accumulation has increased, contributing to the rise of feral dog populations and associated risks such as rabies. It has also affected cultural practices and rural sanitation systems. Although diclofenac was banned in 2006 and safer alternatives introduced, low population levels and ongoing threats made it clear that conservation breeding was necessary. In response, conservation breeding programmes were established in India through collaborations involving the Bombay Natural History Society (BNHS), government agencies, and international organizations. The Vulture Conservation Breeding Centre (VCBC) at Bhopal is a key facility contributing to this effort. The centre focuses on breeding critically endangered species and improving success through systematic management and monitoring.

In addition to natural breeding, techniques such as artificial incubation and hand-rearing have been adopted to enhance productivity. Since vultures lay only one egg per season, any loss can significantly affect

population recovery. Artificial incubation helps rescue and successfully hatch eggs that may otherwise fail, thereby increasing breeding output. At VCBC Bhopal, these methods have proven valuable in improving success rates and supporting long-term conservation goals.



Why Artificial Incubation?

In the wild as well as under captive conditions, vultures generally lay only a single egg during each breeding season. This makes every egg extremely valuable for the survival and recovery of the species. However, not all eggs successfully hatch. Some eggs may be infertile, while others may fail due to natural causes such as parental inexperience, accidental breakage, or disturbances at the nesting site. In certain cases, environmental factors such as fluctuations in temperature and humidity can also affect the development of the embryo, leading to unsuccessful hatching. In conservation breeding centres, despite providing optimal conditions, there are instances where parent birds may not incubate the egg properly or may abandon it. Such situations can result in the loss of potentially viable eggs, which is a significant setback for species that already have very low reproductive rates. Since vultures produce only one egg per year, even a small number of failed eggs can impact the overall success of the breeding programme.

Artificial incubation is therefore used as an important management tool to overcome these challenges. By carefully transferring eggs to incubators where temperature, humidity, and turning of eggs can be



First successful hatch of Long-billed Vulture through artificial incubation at VCBC Bhopal

Process

Egg Collection

Egg collection is carried out when required, usually after the eggs have undergone some natural incubation in the nest. This timing helps ensure better chances of successful development. The process is carefully planned and done quickly to minimize stress to the parent birds. Each egg is handled with great care, avoiding shaking or sudden movements. It is kept in the same position as found in the nest and placed in a soft, cushioned container for safe transport. Proper labelling and record-keeping are done at the time of collection to track each egg throughout the process.

Use of Incubator

Once collected, the eggs are placed in an incubator that provides a controlled and safe environment similar to natural conditions. The temperature is maintained steadily at around 36–37°C to support embryo development. In the initial stage, the incubator is kept dry, and humidity levels are adjusted later based on the condition of the egg. The equipment ensures uniform heating and protection from external disturbances. Continuous power supply and stable conditions are important to avoid any sudden changes. This controlled incubation system greatly improves the chances of successful hatching.



R-Com incubator used for artificial incubation of vulture eggs

Monitoring (Candling & Turning Eggs)

Regular monitoring is an important part of the incubation process to ensure healthy development of the embryo. Candling is done using a light source to observe the internal condition of the egg and track growth. This helps in identifying fertile eggs and detecting any issues early. Eggs are checked periodically, usually every few days, without exposing them to light for too long. In addition, eggs are turned regularly, both automatically by the incubator and manually if needed. This turning prevents the embryo from sticking to the shell and allows proper development.

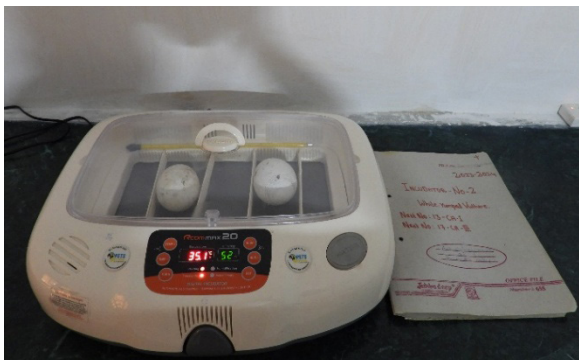
Candling image illustrating embryo visibility and movement inside the egg

Hatching Process

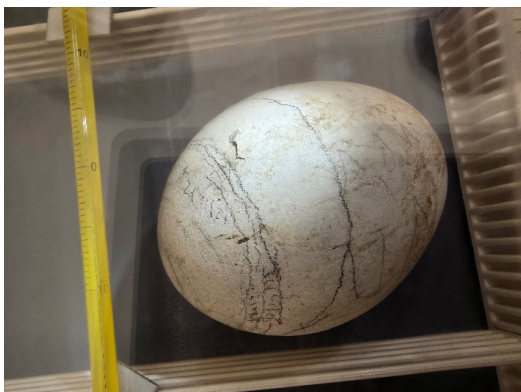
As the embryo reaches full development, the chick begins the hatching process by first breaking the inner membrane and then creating a small crack in the shell. This stage is carefully monitored, and the egg is shifted to a hatcher with higher humidity to prevent drying. The chick gradually enlarges the crack and slowly pushes its way out of the shell. This process can take many hours and requires patience, as interference is avoided unless necessary. After emerging, the chick is usually weak and wet and is allowed to rest. It then dries naturally and gains strength over time.



Candling image illustrating embryo visibility and movement inside the egg



Incubator containing vulture eggs during incubation



Externally pipped egg in the incubator



Newly hatched chick immediately after emergence in the incubator

Hand-Rearing

If required, newly hatched chicks are cared for through hand-rearing in a controlled environment called a brooder. The temperature is kept warm initially and then gradually reduced as the chick grows. For the first several hours, the chick is not fed, as it absorbs

nutrients from the remaining yolk. Feeding starts slowly with small quantities of soft and easily digestible food. Regular monitoring of weight and feeding ensures healthy growth. Chicks are usually kept in small groups to avoid imprinting on humans and to encourage natural behavior before being moved to larger enclosures.



Placement of chick in a support tray to prevent splayed legs



Husbandry and care of chicks under controlled conditions



Preparation of feed for hand-rearing of chicks



Measurement of chick body weight prior to feeding



Hand-feeding procedure and monitoring of chick feeding

Achievements at VCBC Bhopal

The artificial incubation programme at the Vulture Conservation Breeding Centre (VCBC), Bhopal has shown steady progress over the years, with significant improvements in hatching and hand-rearing success. During the initial phase (2023–2024), efforts in artificial incubation began with limited success, where Long-billed Vulture (LBV) eggs showed promising results with successful hatching and hand-rearing, while White-rumped Vulture (WRV) eggs did not hatch. These early trials helped in refining incubation techniques and management practices. In the following year (2024–2025), the programme continued to improve, with successful hatching and hand-rearing recorded again in LBV, although WRV eggs still showed no hatching success. Despite partial success, these outcomes provided valuable learning opportunities and helped



Three-month-old White-rumped Vulture (Gyps bengalensis) chick

strengthen protocols for incubation, monitoring, and chick management. A major breakthrough was achieved during the 2025–2026 breeding season, marking the first successful artificial incubation and hand-rearing of White-rumped Vulture (WRV) chicks at VCBC Bhopal. Out of 9 WRV eggs incubated, 5 chicks were successfully hatched and hand-reared. Similarly, LBV continued to show excellent results, with all 3 eggs successfully hatched and reared. This represents a significant milestone in the centre's conservation efforts. Overall, a total of 22 eggs were incubated, resulting in 12 successful hatchings, all of which were successfully hand-reared, demonstrating a strong improvement in success rate over time. The programme highlights the growing technical capacity and experience at VCBC Bhopal and contributes significantly to the conservation and recovery of critically endangered vulture species in India.



Conservation Impact

Artificial incubation plays a crucial role in strengthening vulture conservation efforts by directly improving population recovery. By increasing the number of chicks produced each breeding season, it helps compensate for low breeding success in the wild. This method also supports reintroduction programmes by providing a reliable supply of healthy individuals for release into natural habitats. Additionally, it reduces complete dependence on natural breeding, which can be affected by factors such as disturbance, egg breakage, or parental abandonment. Overall, artificial incubation enhances both the stability and growth of endangered vulture populations.

Future Scope

The success achieved at VCBC Bhopal highlights the strong potential for scaling up artificial incubation efforts in the coming years. Expanding this approach can significantly contribute to national-level vulture recovery programmes by increasing the number of birds

available for conservation breeding and release. There is also great scope for integrating artificial incubation with ongoing release programmes to strengthen wild populations. Continued refinement of techniques and infrastructure will further improve success rates. With proper planning, this method can become a key component of long-term vulture conservation strategies in India.

Conclusion

Artificial incubation has emerged as a powerful and reliable tool in vulture conservation. It not only enhances breeding success but also supports the long-term survival of critically endangered species. By enabling increased chick production and successful rearing, it plays a vital role in strengthening conservation breeding programmes. When combined with reintroduction efforts, it offers a sustainable pathway for population recovery. Overall, artificial incubation is an essential strategy for securing the future of vultures in the wild.

VISITORS' FEEDBACK SURVEY



Photo Credit: Dr. Shashikant Sharma

Assessing the Educational Impact of the “Touch & Learn” Program at Sardar Patel Zoological Park, Ekta Nagar

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Abstract

Education is a core mandate of modern zoological institutions, serving as a vital interface between conservation science and public engagement. The “Touch & Learn” program at Sardar Patel Zoological Park (SPZP), Ekta Nagar, was designed as an experiential learning initiative to enhance visitor understanding of wildlife biology and conservation. A total of 270 visitor feedback responses were analysed using structured post-program questionnaires. The program recorded very high visitor satisfaction (Mean = 4.92/5), engagement (Mean = 4.91/5), and conservation motivation (Mean = 4.78/5). Based on reported group sizes, the program is estimated to have reached approximately 1,201 individuals, highlighting its substantial educational outreach. Nearly 98.89% of respondents indicated willingness to recommend the program. Statistical analysis indicated minor variation in engagement across group sizes (Kruskal–Wallis $H = 5.35$, $p = 0.021$), while conservation motivation remained consistently high across participants. The results demonstrate that hands-on experiential interpretation is an effective tool for enhancing conservation awareness and visitor engagement. The program represents a scalable model for conservation education in Indian zoological parks.

Introduction

Zoos in India function as *ex-situ* conservation institutions contributing significantly to wildlife conservation, education, and public awareness. Conservation education programs aim to enhance ecological literacy and foster responsible attitudes towards wildlife among visitors.

Experiential learning approaches have been widely recognized as effective tools for promoting engagement and behavioural change. Programs involving hands-on interaction with biological artefacts allow visitors to develop emotional connections with wildlife and improve understanding of species adaptations and conservation challenges.

Sardar Patel Zoological Park has implemented the “Touch & Learn” program as part of its conservation education initiatives from the Year 2024. The program enables visitors to interact with animal artefacts such as skulls, feathers, and other biological specimens

under the supervision of trained educators. This study evaluates the educational effectiveness of the program using visitor feedback analysis.

Study Area

Sardar Patel Zoological Park is located at Ekta Nagar, Dist. Narmada, Gujarat, India. The Zoological Park is spread over 56HA on the Vindhya's and is annually visited by 1 million public. The zoological park serves as a major conservation education centre, receiving visitors from across India. The Zoological Park conducts regular educational programs, guided tours, internships, and public awareness activities aimed at promoting wildlife conservation and environmental stewardship.

Methodology

Program Implementation

The Touch & Learn program is conducted by trained education personnel and involves guided interaction with preserved biological artefacts and interpretive materials. The program focuses on explaining animal adaptations, ecological roles, and conservation threats.

Interpretive Materials Used

The Touch & Learn program utilized a curated collection of non-living biological artefacts to facilitate experiential learning and enhance visitors' understanding of wildlife biology and conservation. The media of the program included naturally shed / discarded animal articles like antlers; eggs, skin, quills, and feathers etc. representing diverse taxonomic groups and ecological adaptations.

Mammalian articles included antlers of Sambar Deer



Figure 1: Visitors participating in the Touch & Learn education program at Sardar Patel Zoological Park.

(*Rusa unicolor*) and Spotted Deer (*Axis axis*), porcupine quills (*Hystrix indica*), and pugmark impressions of Tiger (*Panthera tigris*) prepared using plaster casting techniques. These materials were used to explain animal morphology, identification, behaviour, and ecological roles.

Reptilian articles included shed skins of Indian Cobra (*Naja naja*) and Russell's Viper (*Daboia russelii*), which were used to interpret reptilian adaptations, moulting processes, and ecological importance in controlling prey populations.

Avian articles included feathers of Macaw (*Ara spp.*), Indian Peafowl (*Pavo cristatus*), African Crowned Crane (*Balearica regulorum*), and an Ostrich egg (*Struthio camelus*). These materials were used to explain feather structure, flight adaptations, thermoregulation, and reproductive biology.

Additionally, beehive (deadout) of the Indian Honey Bee (*Apis cerana*) were used to interpret insect social organization, pollination ecology, and ecosystem services.

All animal articles were used under educator supervision to promote safe handling and scientific interpretation. The use of authentic biological materials enabled tactile engagement and enhanced visitor comprehension of wildlife adaptations and conservation concepts.

Data Collection

Visitor feedback was collected using a structured questionnaire immediately after program participation. The questionnaire included Likert scale ratings (1–5) for:

- Overall experience
- Engagement level
- Learning effectiveness
- Conservation motivation
- Recommendation intent

A total of 270 valid responses were analysed.

Educational Reach Estimation

Visitors reported the number of individuals in their group. Estimated program reach was calculated using midpoint values of reported group size ranges.



Figure 2: Education staff explaining animal adaptations using biological artefacts.

Statistical Analysis

Descriptive statistics were used to calculate mean ratings.

Non-parametric statistical tests were applied:

- Spearman correlation to assess association between engagement and conservation motivation
- Kruskal–Wallis test to evaluate engagement differences across group sizes

Results

Educational Reach

Based on reported group sizes, the program is estimated to have reached approximately 1,201 individuals, with an estimated range of 810–1,620 individuals. The mean size group was 4.45 persons per respondent, indicating significant educational outreach.

Visitor Experience and Engagement

Parameter	Mean	Median
Overall Experience	4.92	5
Engagement Level	4.91	5
Learning Effectiveness	4.89	5
Conservation Motivation	4.78	5

Table 1: Visitor ratings for the Touch & Learn program (n = 270)

Visitor responses indicated consistently high levels of satisfaction and engagement (Fig. 1).

Recommendation Intent

Response	Percentage
Yes	98.89%
No	1.11%

Table 2: Recommendation rate of the Touch & Learn program

This indicates strong visitor endorsement and perceived educational value.

Statistical Analysis Results

Spearman correlation analysis showed no significant association between engagement and conservation motivation ($p = 0.058$, $p = 0.347$), indicating consistently high motivation across all engagement levels.

Kruskal–Wallis analysis revealed statistically significant but small differences in engagement across group sizes ($H = 5.35$, $p = 0.021$), indicating minor variation in visitor experience depending on group size.

Discussion

The Touch & Learn program at Sardar Patel Zoological Park demonstrated high effectiveness in enhancing visitor engagement, conservation awareness, and educational impact. The consistently high satisfaction (Mean = 4.92/5) and engagement scores (Mean = 4.91/5) indicate that the experiential, hands-on approach successfully captured visitor attention and facilitated meaningful interaction. Experiential learning methods, particularly those involving tactile engagement, are known to improve comprehension and retention by allowing participants to actively interact with interpretive materials rather than passively receiving information.

A key strength of the program was the use of natural articles which included antlers of Sambar Deer (*Rusa unicolor*) and Spotted Deer (*Axis axis*), porcupine quills (*Hystrix indica*), shed skins of Indian Cobra (*Naja naja*) and Russell's Viper (*Daboia russelii*), feathers of Macaw (*Ara spp.*), Indian Peafowl (*Pavo cristatus*), and African Crowned Crane (*Balearica regulorum*), an Ostrich egg (*Struthio camelus*), beehive (honeycomb) structures, and pugmarks (plaster casts) of Tiger (*Panthera tigris*). These animal articles provided visitors with a tangible understanding of animal morphology, structural adaptations, and ecological roles. Direct interaction with real biological specimens enhances sensory engagement and allows visitors to better visualize and understand wildlife adaptations, such as antler growth, feather structure, reptilian moulting, and large cat identification through pugmarks. This tactile learning approach promotes curiosity and strengthens the educational impact of conservation interpretation.

The program's estimated reach of approximately 1,201 individuals demonstrates its significant contribution to conservation education outreach. Since visitors often participated in groups, the educational impact extended beyond individual respondents, influencing families, students (Fig. 2), and organized groups. Group-based learning environments facilitate social interaction and discussion, which can reinforce conservation messaging and promote collective awareness. Such outreach plays a crucial role in strengthening public understanding of biodiversity and conservation issues (Fig. 3).

Statistical analysis indicated minor but statistically significant differences in engagement across group sizes (Kruskal-Wallis $H = 5.35$, $p = 0.021$), although the effect size was small. This suggests that interaction dynamics may vary slightly depending on group structure, with



Figure 3: Visitor interaction with interpretive materials during the Touch & Learn session.

smaller groups potentially allowing more individualized interaction with educators and artefacts. However, engagement levels remained consistently high across all group categories, indicating that the program was effective in delivering educational content regardless of group size. This demonstrates the adaptability of the program and the effectiveness of trained educators in facilitating interactive learning across diverse visitor groups.

The conservation motivation score (Mean = 4.78/5) indicates that the program successfully promoted pro-conservation attitudes among visitors. Exposure to biological artefacts helps visitors develop a deeper appreciation for wildlife and fosters emotional connections with animals, which are important factors in shaping conservation-oriented behaviour. The ability to physically examine artefacts such as reptile skins and antlers enables visitors to better understand animal biology and ecological functions, thereby reinforcing conservation messages. The weak and non-significant correlation between engagement and conservation motivation ($p = 0.058$, $p = 0.347$) suggests that conservation awareness was consistently high among participants, likely reflecting the overall effectiveness of the educational experience.

Conclusion

The Touch & Learn program at Sardar Patel Zoological Park, Ekta Nagar is an effective conservation education initiative that successfully enhances visitor engagement and conservation awareness. The program has achieved high visitor satisfaction, strong conservation motivation, and significant educational reach. The results support the continued implementation and expansion of experiential learning programs in zoological institutions to strengthen conservation education outcomes.

Enhancing Visitor Experience of Zoo Safari through Visitors' Feedback Survey: A Case Study of Rajgir Zoo Safari, Bihar

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Abstract

Rajgir Zoo Safari represents an emerging model of wildlife-based ecotourism in eastern India that integrates conservation awareness, immersive visitor experiences, and natural habitat representation. This study evaluates visitor perceptions of infrastructure, wildlife viewing, educational impact, and overall satisfaction through a structured survey. A total of 1005 respondents participated in a Likert-scale-based questionnaire assessing five experiential categories: entrance experience, infrastructure and ambience, animal viewing, conservation learning, and visitor amenities. Results indicate consistently high satisfaction across all parameters, with average ratings ranging from 4.22 to 4.57 out of 5.00. Additionally, 73.5% of respondents expressed willingness to revisit the safari, demonstrating strong visitor loyalty and tourism potential. The findings highlight Rajgir Zoo Safari as a successful model for integrating ecotourism with conservation education and public engagement.

Introduction

The idea of developing a world-class ecotourism facility in Rajgir originated in 2008 when Shri Nitish Kumar, Hon'ble Chief Minister of Bihar, visited the erstwhile Mrig Vihar and envisioned transforming it into a modern wildlife-based safari to promote conservation awareness and sustainable tourism. The project was implemented by the Bihar Forest Department under the guidance of Dr. Gopal Singh, IFS, Regional Chief Conservator of Forest, Patna-cum- Chairman, Project Monitoring Committee, Rajgir Zoo Safari. Since its inauguration on 16 February 2022, Rajgir Zoo Safari has attracted more than 1.6 million visitors, emerging as a major tourism destination in Bihar.

Despite its growing popularity, systematic evaluation of visitor perceptions and experiences remains limited. Therefore, the present study aims to assess visitor satisfaction, conservation learning, and revisit intention at Rajgir Zoo Safari through a structured visitor survey to support improved management and conservation engagement.



Study Area: Rajgir Zoo Safari

Rajgir Zoo Safari is located in the historically and culturally significant city of Rajgir in Bihar. Rajgir, formerly known as Rajgriha, served as the ancient capital of the Magadha Empire and remains an important pilgrimage centre for followers of Buddhism, Jainism, Hinduism, and Sikhism. Major tourist attractions in the region include Vishwa Shanti Stupa, Venu Van, and Giridhkuta Hill, which are closely associated with the teachings of Gautama Buddha. The ruins of the ancient Nalanda University, a UNESCO World Heritage site, are also located nearby.

The safari consists of five drive-through wildlife zones:

Safari Zone	Area (ha)	Key Species
Herbivore Safari	30.35	Sambar, Chital, Hog Deer, Barking Deer, Blackbuck, Nilgai
Bear Safari	20.60	Sloth Bear
Leopard Safari	20.83	Indian Leopard
Tiger Safari	20.50	Royal Bengal Tiger
Lion Safari	20.54	Asiatic Lion

These large safari zones allow animals to move freely within forested habitats while visitors observe them from secure vehicles.

Unique Infrastructure and Facilities at Rajgir Zoo Safari



- **Centralized Control Room:** Real-time monitoring system with more than **350 CCTV cameras** across the safari.
- **Scientific Tourist Management System:** A regulated visitor management system allowing up to 2000 visitors per day, supported by dashboard-based monitoring.
- **Customized Safari Buses:** Specially designed vehicles enabling safe and comfortable wildlife viewing during drive-through safaris.
- **Superior Construction Standards:** Infrastructure built using high-quality materials like Stainless Steel (SS) instead of Mild Steel (MS) which appreciated by Central Zoo Authority.
- **Large Naturalistic Safari Enclosures:** Spacious habitats exceeding 20 hectares that allow animals to express wild natural behaviour.

Visitor Facilities and Attractions

Rajgir Zoo Safari offers several facilities to enhance visitor engagement and comfort.

Major attractions include:

1. Interpretation centre with conservation exhibits
2. 180-degree immersive theatre screening wildlife films
3. Exotics bird Aviary
4. Children's Park
5. Selfie points and scenic viewpoints
6. Open theatre for awareness programmes

Visitor amenities include drinking water facilities, restrooms, wheelchair access, golf carts, food counter services, souvenir shops, and cloak rooms.

Methodology

A structured visitor perception survey was conducted to evaluate visitor satisfaction and experience at Rajgir Zoo Safari. The survey used a five-point Likert scale questionnaire assessing visitor satisfaction across key experiential parameters.

The rating scale ranged from:

- 1 – Very Poor
- 2 – Poor
- 3 – Average
- 4 – Good
- 5 – Excellent

The questionnaire was provided in Hindi and English to ensure accessibility for a diverse range of visitors. Initially, the survey was conducted using printed questionnaires; however, from August onwards it was transitioned to an online format to improve ease of participation and data management.

The online survey was administered through digital forms accessible via QR codes placed at key visitor locations such as entry gates, interpretation centres, and visitor waiting areas. Participation in the survey was voluntary and anonymous.

A total of 1005 valid responses were collected for the main rating questions.

Five key variables were evaluated:

1. Entrance experience
2. Layout, cleanliness, and ambience
3. Animal viewing experience
4. Learning about wildlife conservation
5. Visitor amenities

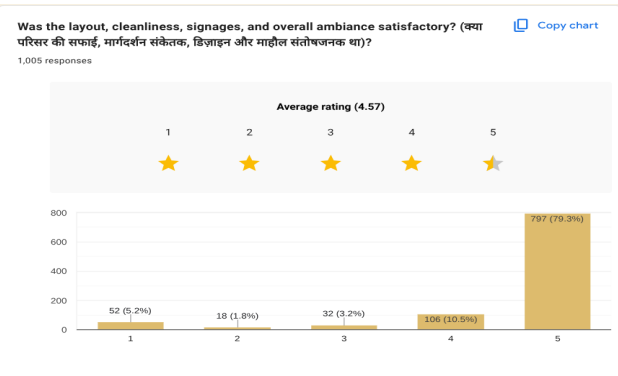
Survey data were analysed using descriptive statistical methods to calculate mean satisfaction scores and response distributions.

Results and Discussion

Average visitor ratings across the five evaluated categories are presented below:

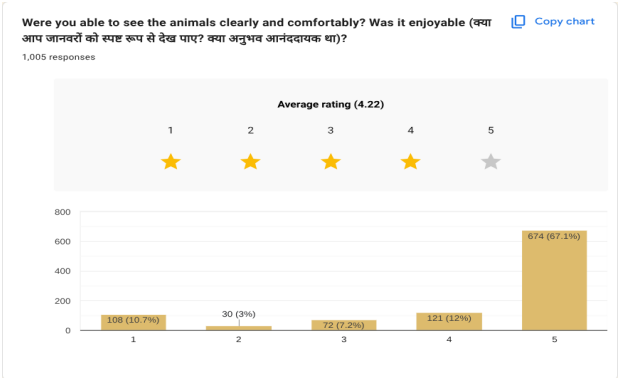
Experience Parameter	Average Rating
Entrance Experience	4.39
Layout, Cleanliness & Ambience	4.57
Animal Viewing Experience	4.22
Learning about Wildlife Conservation	4.37
Amenities & Visitor Facilities	4.33

Entrance Experience



The highest rating was recorded for layout, cleanliness, and ambience, indicating strong appreciation of the safari’s landscape design and maintenance.

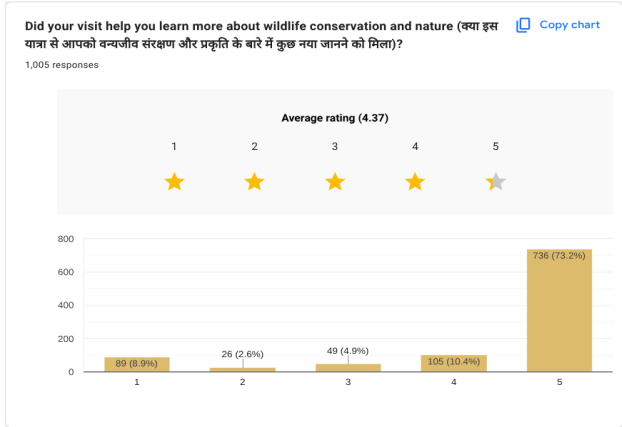
Wildlife Viewing Experience



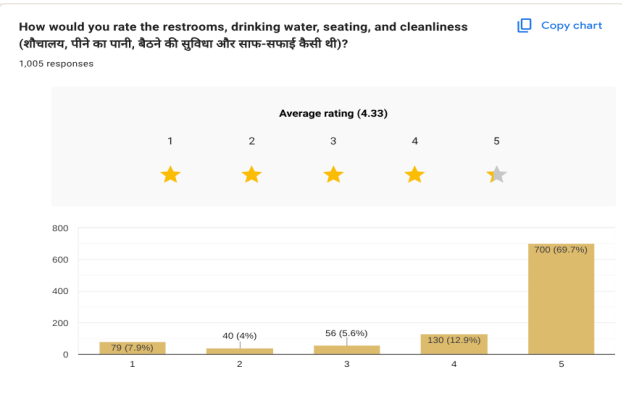
Animal viewing received an average rating of 4.22, with approximately 67% of visitors rating the experience as excellent. While slightly lower than other parameters, this rating still indicates strong satisfaction. Variations in wildlife visibility are common in large naturalistic enclosures where animals exhibit natural behaviour.

Educational Impact

Learning about wildlife conservation received a high rating of 4.37, demonstrating that interpretive facilities such as the interpretation centre and immersive theatre effectively communicate conservation messages.



Visitor Amenities



Facilities such as restrooms, drinking water, and seating areas received a rating of 4.33, indicating strong satisfaction with visitor services and infrastructure.

Visitor Loyalty

Visitor revisit intention showed strong tourism potential:

Response	Percentage
Yes	73.5%
Maybe	16%
No	10.5%

High revisit intention suggests that the safari provides memorable and enjoyable wildlife experiences.

Visitor Feedback–Driven Enhancements at Rajgir Zoo Safari

The safari management team not only collect visitor feedback but also actively consider their suggestions and implement them as improvements. Several facilities have been upgraded based on visitor feedback, some of which are highlighted below.

1. QR-Based Feedback System: Visitors can scan QR codes to submit real-time feedback after their visit.
2. Live LED Display at Ticket Counter: Digital screens provide important information and updates to visitors.

3. Mobile Charging Stations: Charging points installed for visitor convenience within the campus.
4. Mist Fans in Open Areas: Cooling systems installed in waiting areas to improve visitor comfort during summer.



Visitor feedback is regularly reviewed through a structured monitoring system at Rajgir Zoo Safari. The Deputy Director (also Public Relations Officer) conducts weekly meetings with Rangers and Foresters to assess feedback and implement improvements, while policy-level issues are referred to the Director for further action.

Conclusion

The study demonstrates that Rajgir Zoo Safari successfully integrates wildlife conservation, visitor engagement, and ecotourism development.

Survey results indicate high levels of visitor satisfaction across all evaluated parameters, with average ratings exceeding 4.2 out of 5. Infrastructure quality, educational engagement, and visitor amenities were particularly appreciated by visitors. With strong visitor satisfaction and high revisit intention, Rajgir Zoo Safari has emerged as a major wildlife tourism destination in eastern India and an effective platform for promoting biodiversity conservation awareness.

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NOTES



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