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MEE-ZOO

Management Effectiveness Evaluation of Zoos in India 2022

MEE-Zoo

Assessment Report

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आज़ादी का अमृत महोत्सव

भूपेन्द्र यादव
BHUPENDER YADAV

MESSAGE

Modern zoos have evolved considerably and they contribute significantly towards conservation, public education, as well as achieving higher standards of captive animal welfare and awareness for wildlife conservation. The zoo environment must be evaluated for its impact on the animals, zoo visitors and staff. The increased emphasis on evaluation is due to societal changes, especially the increased demand for accountability and transparency.

One of the primary challenges for the zoos today is that the perception of the role of the zoo has not been fully characterised. It is further important to identify specific cultural attributes and to address anthropogenic or demographic challenges for achieving the set aims. Independent and transparent evaluation processes aid in the holistic understanding of effective management.

The Central Zoo Authority has set norms for zoo evaluation which informs decision on recognition of zoos. The recommendations are aimed at improving animal care and welfare standards. Evaluation results are helpful to managers in adaptive management, for increased accountability & improved resource allocation. Evaluation is thus a tool, and the evaluation findings must be used positively for monitoring activity and projects, achieving improved cooperation and efficient resource utilisation.

MEE-Zoo is developed by adoption of the Management Effective Evaluation Standards used for Protected Areas. It is an evidence based, comprehensive exercise encouraging zoos to adhere to their core values and stay on the path of innovation and conservation leadership. The MEE- Zoo evaluation is unique and will bring a fresh perspective to Indian zoo operations and management.

I compliment the Central Zoo Authority, the team of evaluators and the zoos for their efforts and wish them the best for all such future endeavours.

With best wishes.

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(Bhupender Yadav)

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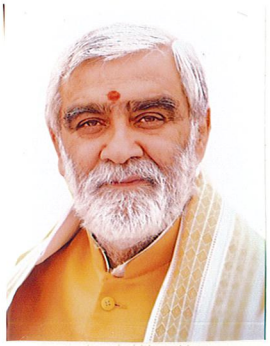

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आहारशुद्धौ सत्त्वशुद्धिः
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राज्य मंत्री
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संदेश

चिड़ियाघर प्रबंधन को मजबूत करने और यह सुनिश्चित करने के लिए कि चिड़ियाघर वन्यजीव संरक्षण में प्रभावी रूप से योगदान करते हैं, केन्द्रीय चिड़ियाघर प्राधिकरण ने भारतीय वन्यजीव संस्थान के सहयोग से मान्यता प्राप्त चिड़ियाघरों के लिए भारतीय चिड़ियाघरों की प्रबंधन प्रभावशीलता (एमईई-चिड़ियाघर) ढांचा विकसित किया है। यह एमईई के सिद्धांतों पर आधारित है जो भारत में संरक्षित क्षेत्रों के मूल्यांकन के लिए नियोजित हैं।

एक प्रभावी और परिणामोन्मुख प्रबंधन व्यवस्था के निर्माण के लिए एक मजबूत मूल्यांकन पद्धति आवश्यक है। प्रबंधन प्रभावशीलता मूल्यांकन प्रक्रिया (एमईई-चिड़ियाघर) सतत एवं समग्र रूपरेखा है, जो दिशानिर्देशों, मानदंडों और संकेतकों को उल्लेखित करती है।

मुझे विश्वास है कि केन्द्रीय चिड़ियाघर का यह अनूठा प्रयास देश भर में फैले चिड़ियाघरों में कार्यरत वन्यजीव संरक्षकों को वन्यजीव संरक्षण में हो रहे अनुसंधान एवं शोध की विस्तृत जानकारी देगा, साथ ही वन्यजीव संरक्षण के क्षेत्र में किए जा रहे प्रयासों को संबल देगा।

मैं केन्द्रीय चिड़ियाघर प्राधिकरण और इस विषय से जुडे सभी विशेषज्ञों को इस विस्तृत रुपरेखा को तैयार करने एवं उनकी सक्रिय सहभागिता देने के लिए उनकी प्रशंसा करता हूँ।

(अश्विनी कुमार चौबे)

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PREFACE

The Protected Areas in India are a cornerstone of the wildlife and habitat conservation paradigm in India. The management effectiveness of protected areas helps ascertain if the goals and objectives are being met while protecting its core values. This assessment is key for both managers and policy makers.

Modern zoos showcase captive animals to function as backup populations for wild animals under threat, as well as "ambassadors" for their species. Ex-situ conservation in zoos is an integral part of the global movement to address the loss of biodiversity and spread awareness about the environment.

The evaluation of zoo management has a standing to help zoos to function optimally and continue to deliver the objectives in the National policies and maintain the integrity of ex-situ conservation values. The concept of borrowing the expertise and experience from MEE for Protected Areas and applying the same to zoological institutions is however unique. MEE-Zoo is a holistic and independent exercise that qualitatively evaluates the management across several verticals and is this able to assess issues that need to be proactively addressed.

MEE- Zoo can enable and support an adaptive approach to management, assist in effective resource allocation and promote accountability and transparency. The first round of these evaluations has been an eye-opener and has led to an improved understanding of the situation on the ground. We hope to incorporate our learnings to continue this endeavour and engage with zoos to work cohesively towards effective ex-situ conservation action.

05/09/2022

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1. Introduction

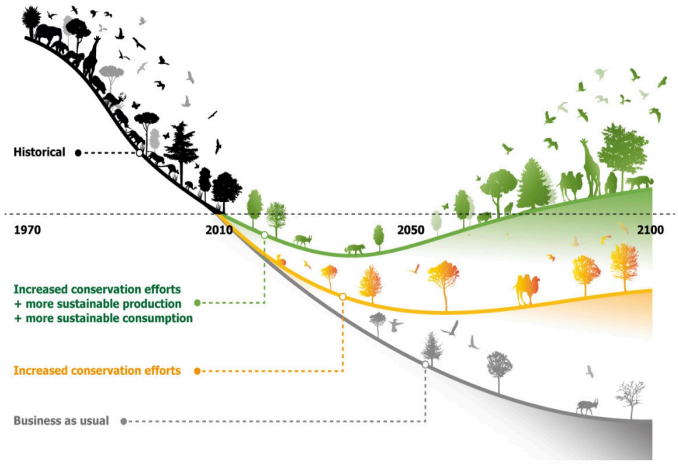
1. Introduction

Nature is an infinite sphere of which the center is everywhere and the circumference nowhere. ~ Blaise Pascal

India is a biodiversity hotspot, with ecosystems ranging from the Himalayas in the north to the evergreen rain forests in the south, the sands of the west to the marshy mangroves of the east. India is home to nearly 8% of global biodiversity on just 2.3% of global land area and has sections of four of the 36 global biodiversity hotspots. India's unique and diverse ecosystems, distributed across many landscapes, rivers, and oceans are economically valuable too.

The Living Planet Report 2020, published by WWF, has revealed a global species loss of 68% in less than 50 years; a catastrophic decline never seen before. Converting land for agriculture has caused 70% of global biodiversity loss and half of all loss in tree cover. Since 2000, 1.9 million km^2 of wild and undeveloped land has been lost through conversion.

India's ecological footprint is smaller than that of many large countries. Based on new research by a global group of scientists, published in the journal Nature on September 10, 2020, the Living Planet report calls for action to halt and reverse the downward spiral of wildlife loss. The research shows that this decline can be reversed if ambitious conservation efforts to protect wildlife are combined with stopping habitat loss and deforestation.



Bending the curve of biodiversity loss. Graphic from the Living Planet 2020 report.

The reality of the modern world is that increasing human population is demanding more resources than the earth can provide. Humans are utilizing resources like water and fossil fuels and are in turn polluting and causing a shift in the global climate. Most importantly, humans are taking previously untouched land and utilizing it for living space or agriculture. Therefore, there is very little "wild" left after human use, and this rapid consumption is adversely affecting all other animal species on this planet.

With several simultaneous pressures on the natural ecosystems many species are dramatically declining towards extinction.

Zoos are often established to complement in-situ species conservation. Zoos have undergone dramatic changes over the years. Zoos did not start off with conservation being a primary focus, however as they evolved, the focus shifted from exhibition to preservation. The modern zoo has conservation as one of its main priorities, which also includes education, entertainment, and research – a focus that is more comprehensive and serves to guide the actions of the modern zoo. Zoos blend well into the conservation planning systems for global species preservation. They are recognised as essential places where several species which are under threat can be preserved.

While conservation is a main priority of the modern zoo, it is merely the tip of the iceberg in terms of initiatives that zoos undertake.

Modern zoos work towards providing the best possible standard of care for all the animals. Welfare can be ensured by the building and maintenance of safe, stimulating habitats which provide species-specific natural behavioural and environmental opportunities. Animals are kept in appropriate social groups with enrichment, a balanced nutritious diet, and a proactive veterinary care.

Assessment of the management effectiveness in zoos will allow for dynamic evolution of the systems essential to fulfil all the mandates of the zoo. It also intends to achieve the vision of species preservation with cutting edge research and utilisation of modern technologies to operate at par with global standards.

1.1 CZA mandate and vision for management of zoos

The Central Zoo Authority (CZA) is a statutory body of the Ministry of Environment, Forest and Climate Change, Government of India. The Central Zoo Authority was created by the Government of India in 1992 through an amendment to the Wild Life (Protection) Act, 1972. The main objective is to oversee the functioning of zoos and to enforce minimum standards and norms for upkeep and health care of animals in Indian zoos. This complements and strengthens the national efforts in conservation of wild fauna.

To give proper direction and thrust to the management of zoos in the country, the National Zoo Policy was notified by the Government of India in 1998. This policy supports the conservation of endangered species by giving threatened species a chance through coordinated breeding under ex-situ conditions and raise stocks for rehabilitating them in the wild. Conservation education and research are the other objectives of zoos enshrined in the National Zoo Policy.

CZA is committed to promoting species conservation and animal welfare by leveraging scope, expertise in the zoos across India.

Mission: To provide better upkeep and veterinary care to the wild animal housed in zoos in India to ensure their conservation through best practices of management and bringing education & awareness among the people.

Vision: To complement and strengthen the national efforts in conservation of the biodiversity of the country, particularly the fauna through the ex-situ conservation linked with in-situ practices.

Objectives: The main objective of Central Zoo Authority (CZA) is to enforce minimum standards and norms for upkeep and healthcare of animals in Indian zoos and to control mushrooming of unplanned and ill-conceived zoos.

Functions: The statutory functions of the Authority under the Act are:

Zoos in India are regulated under the provisions of the Wild Life (Protection) Act, 1972 and are guided by the National Zoo Policy, 1998. The Government of India formulated Recognition of Zoo Rules, 1992 and revised as Recognition of Zoo Rules, 2009 on the recommendation of the Central Zoo Authority. These rules lay down standards and norms for management of zoos in the country.

The Authority has been assigned following functions under Section 38 (C) of the Wild Life (Protection) Act, 1972:

- To specify the minimum standards for housing, upkeep and veterinary care of the animals kept in zoos;
- To evaluate and assess the functioning of the zoos with respect to the prescribed standards or norms;
- To recognize or derecognize zoos;
- To identify endangered species of wild animals for purposes of captive breeding and assigning responsibility in this regard to a zoo.
- To coordinate the acquisition, exchange, and loaning of animals for breeding purpose.
- To ensure maintenance of studbooks of endangered species of wild animals bred in captivity.
- To identify priorities and themes with regard to display of captive animals in zoos.
- To coordinate training of zoo personnel in India and outside India.
- To coordinate research in captive breeding and educational programmes for the purposes of zoos.
- To provide technical and other assistance to zoos for their proper management and development on scientific lines.
- To perform such other functions as may be necessary to carry out the purposes of this Act with regard to zoos.

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2. MEE process and method

2. MEE process and method

2.1 Introduction

A strong evaluation culture is essential to build an effective and result oriented management regime. MEE is often used to assessfunctionality of Protected Areas in India. It is used to ascertain whether the goals and objectives are being met. Assessment of protected area MEE has emerged as a key tool for PA managers, and it is well recognized by the government over the past 10-15 years. This strong tool has helped PA Managers identify lacunae and strengthen systems to achieve the intended objectives.

Based on this a framework was designed, which proposes guidelines, criteria and indicators for evaluation of zoos of the country through the Management Effectiveness Evaluation Process (MEE-ZOO) in a manner which is holistic. The assessment criteria and indicators look beyond the traditional concepts & include issues of animal welfare, husbandry and sustainability of resources and finance.

The MEE-ZOO aims to advance zoo management across India while adhering to core values of accountability, transparency, innovation, use of technology, collaboration and integrity to achieve the mandate of conservation of endangered species.

2.2 What is a Management Effectiveness Evaluation- ZOO Assessment-?

Management effective evaluations can:

- Enable and support an adaptive approach to management
- Assist in effective resource allocation
- Promote accountability and transparency
- Help involve the community and build constituencies

The WCPA Framework for Assessing Management Effectiveness in Protected Areas is adapted and modified to fit zoo management criteria. The framework has six elements: context, planning, inputs, processes, outputs and outcomes (Figure 1). It is a guide towards developing strong, data dependent assessment systems.

The WCPA Framework sees management as a process or cycle with six distinct stages, or elements:

a) It begins with establishing the context of existing values and threats,

b) progresses through planning and

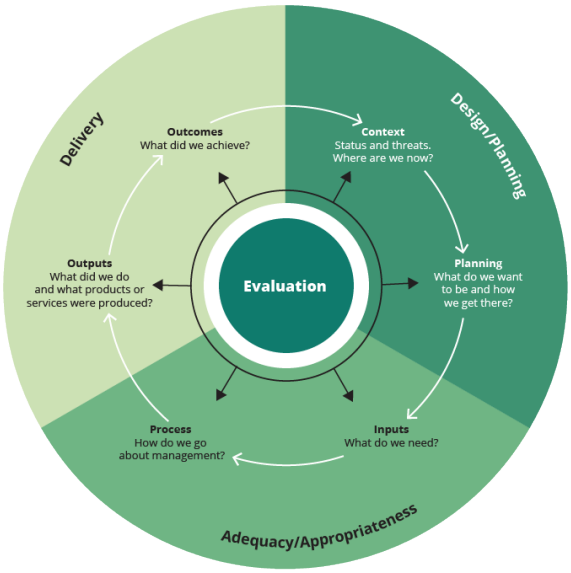
c) allocation of resources (inputs)

d) as a result of management actions (process) and

e) eventually produces goods and services (outputs)

f) that result in impacts or outcomes.

Of these elements, the outcomes most clearly indicate whether the site is maintaining its core values, but the outcomes can also be the most difficult element to measure quantitatively. The other elements of the framework are all also important for helping identify particular areas where management might need to be adapted or improved.



The WCPA Framework for Assessing Management Effectiveness

2.3 Why do we need Evaluation/Assessment?

It is globally recognised that declaration of protected areas does not always result in adequate protection, thus the need to evaluate protected area management effectiveness has become increasingly accepted internationally (Hockings and Phillips, 1999; Hockings et al., 2000; Ervin, 2003a). The calls for proper accountability, good business practices and transparency in reporting have increased (Hockings et al, 2006). Evaluation is also critical for adaptive management. We live in a world where we experience and can expect dramatic changes – in the biophysical world, the community, the economy and the way we govern ourselves. This holds true for all management related to zoological institutions as well. As global change accelerates, evaluations should be able to quantitatively show to what extent protected areas and zoos are an effective strategy for conservation.

Evaluation of management effectiveness is thus a vital component of this responsive, pro-active style of management. Through evaluation, both positive and negative experiences can be used as opportunities for learning, and continual improvement can be combined with anticipation of future threats and opportunities. Evaluating the complex zoo management ecosystem to identify gaps that need to be strengthened will only support the management

of Indian Zoos to achieve the broad objectives laid out individually by the zoos and collectively by the national Zoo Policy.

The key benefits of MEE of Zoos are:

1. Discrete, holistic and independent exercise
2. Understand and promote adaptive management to improve efficiency and understanding
3. Assess the achievement of the goals and objective of ex-situ conservation
4. Ensure appropriate resource allocation and prioritization
5. Generate base line data for comparison
6. Scoring system used for grading

2.4 The Framework for Assessing Management Effectiveness

The salient features of the proposed assessment framework are as follows:

1. Comprehensive, useful, discrete, holistic and independent, relevant criteria and indicators.
2. Logical, systematic, stable and balanced framework
3. Structured with guidance notes, replicable and accurate
4. Evidence based independent assessment gives clear guidance to measure and score indicators
5. Indicators are precise and consistent and can link up
6. Measurable in quantitative and qualitative terms
7. Rapid assessment with minimum budgetary support
8. User friendly, practical and achievable
9. Clear and specific focus with strategic guidance and action for improvement
10. Assessment will lead to grading of Zoos in various categories

The assessment criteria for zoos are based on the provisions (Chapter IV) of the Wildlife (Protection) Act, 1972 and the rules framed under the enabling provision of the Act, Recognition of Zoo Rules, 2009 and are as follows:

1. Strategic planning and development
2. Animal housing, Naturalistic Environment and Exhibits designs
3. Animal Collection and sustainability of population
4. Human Resource Management

5. Health Care
6. Sanitation, Hygiene and waste Management
7. Conservation/ Captive Breeding Programme
8. Research
9. Education and Extension
10. Visitor facility

The MEE framework for Zoos has six distinct elements:

1. *Context* which will establish the mandate, role of Zoos for conservation of species
2. *Planning* will include all the efforts in conceiving, designing the ex-situ conservation facility and formulating a management strategy
3. Availability of resources and infrastructure put into managing the zoo- *Inputs*
4. Management actions and protocols (*Process*) and
5. Goods and services (*Outputs*)
6. That results in *impacts*.

2.5 Zoos in India assessed by MEE process 2021

The zoo assessment reflects on:

(1) Proactively engaging in science, initiating conservation action, education, and research to inspire visitors to value nature

(2) Use of technology and tools to improve visitor experience and enhance animal welfare

(3) Motivate staff, delegate work, monitor closely for achieving the targets, and involve all sections of society and conservation interest groups as stakeholders for inclusive management.

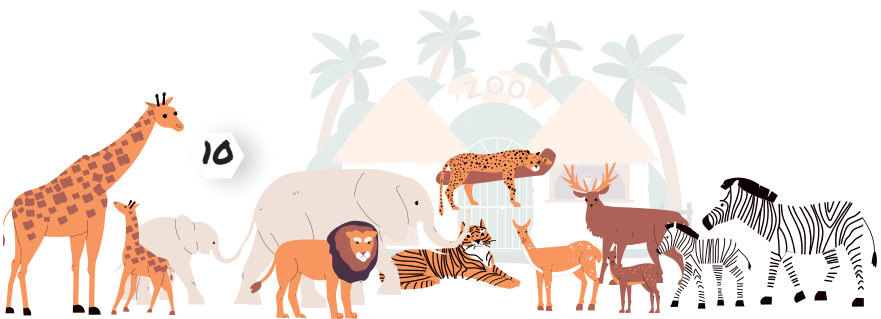
(4) Addressing welfare issues of the staff who have committed themselves to the task of conservation and animal welfare.

(5) The education and outreach program supported with digital media and web-based interactive system.

(6) The visitor feedback is the most important input for improving our conservation program and being responsive to the needs of our society. This will address any shortcoming that were overlooked and will provide a redressal mechanism.

(7) Research in ex-situ with focus and cooperation of individuals and institutions willing to participate and collaborate. Dissemination of research findings.

(8) Mobilizing financial recources based on their capacity to generate resources and become self-sufficient. Advocacy of Zoos as conservation centres will improve the finances much



needed for future development of zoos.

(9) Promoting gender equity in zoos by sensitizing the employees and workforce that both genders have equal role in the welfare of animals. Recognising advancement of gender equality in Zoo work environment with representation, progression and equal opportunity for all.

Currently, there are 147 recognized zoos in the country categorized as large (17), medium (23), small (33), mini (60) zoos and rescue centres (14). In this phase of the MEE-Zoo, 41 Zoos from large and medium categories zoo were selected for evaluation. Out of the 41 Zoos, 39 zoos underwent the evaluation process.

V.O.C. Park Zoo, Coimbatore, and Pililkula Biological Park, Pilikula could not be evaluated and are not included in the analysis.

2.6 Assessment criteria and Process

In order to ensure credibility of the assessment process a committee of 15 independent experts was constituted. The Technical Manual 'Guidelines, Criteria and Indicators for Evaluation of Indian Zoological Park through Management Effectiveness Evaluation Process (MEE-ZOO) (Tyagi et al, 2020) was used for MEE process.

The evaluators conducted the assessment of all 39 Zoos as per the prescribed criteria and completed the MEE Score Card. The questions, where the criteria and indicators did not qualify for evaluation for any zoo, were not marked or considered in the total score for that particular zoo. Explanatory notes were provided to guide the assessment process. Against each 'Criteria' the evaluation team indicated the 'Reference document(s)' and provided 'Remarks', as appropriate.

The MEE framework of Zoos was evaluated in six elements, each with a different focus of evaluation. The key focus of each element is given in Table 1.

Table 1: Key focus of evaluation in six elements of MEE framework of Zoos

Elements of evaluation	Criteria Proposed
Context	• Mission, Vision, objectives, and Strategy of the Zoo • Compliance with the essential requirements • Zoo landscape and its environment • Ethical standards and norms
Planning	• Planning process: master plan • Specific strategies and plans: Enrichment Plan, Education Plan, Visitor Management Plan, landscape management and Disaster Management strategy • Captive/ Conservation Breeding Plan, norms and strategy

Input	• Human and financial resource • Training and Capacity Building • Visitor and education infrastructure • Healthcare, Nutrition, and sanitation • Protection infrastructure
Process	• Sustainability of animal population and resources • Stakeholder participation • Health care • Zoo enforcement • Animal welfare • Species specific enrichment • Use relevant technologies for conservation, education, research • Rescue and rehabilitation
Output	• Research activities and collaboration • Safety of animals, animal keepers and visitors • Sanitation and hygiene regime • Achieving animal welfare • Maintaining database on animals • Zoo Veterinarian and staff performance • Responding to emergencies
Outcomes	• Health of animals • Rescue and rehabilitation of animals • Contribution of Zoo Animal keepers, veterinarian and supporting staff • Conservation breeding programme • human resource development • Visitor learning experience • Research relevance • Climate Change • Innovative technology and best management practices

For assessment of 6 elements of the MEE framework, 40 criteria (headline indicators) were developed (3 to 8 questions were developed in each element) TABLE 2.

Table 2: List of 40 headline indicators (questions) developed for MEE of Zoos

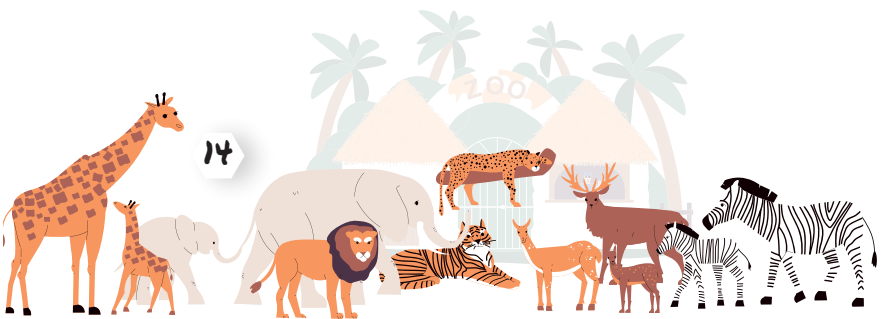
Elements	Headline Indicators
1. Context	1.1 Are the Mission, Vision, Objectives and Strategy of the Zoo formulated as per the National Zoo Policy,1998?
	1.2 Has the Zoo complied with the essential requirements (ER) (Statutory and Guidelines) along with the conditions imposed while granting Recognition under RZR, 2009.
	1.3 Is the Zoo landscape and its environment naturalistic?
2. Planning	2.1 Does the Zoo have a Master Plan for management of the Zoo and is periodically updated?
	2.2 Has the Zoo drawn up relevant plan for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management?
	2.3 Does the Zoo have an education programme as per standards prescribed by RZR, 2009?
	2.4 Has the Zoo formulated a Disaster Management Strategy (DMS), security plan and mechanism for security audit (SA)?
	2.5 Does the Conservation breeding program meets the standard prescribed by RZR,2009?
3. Input	3.1 Does the Zoo have adequate resources (financial), timely released and linked to priority activities?
	3.2 Does the Zoo mobilizes additional resources (financial) and generate funds for financial sustainability?
	3.3 Is the administrative, staffing pattern, access to resources, training and capacity building adequate in accordance with RZR, 2009?
	3.4 Does the Zoo have enough manpower to cater adequate Zoo Animal medicine and Health necessities?
	3.5 Does the Zoo have visitor facilities (education and interpretation), marketing and promotional material?
	3.6 Does the Zoo have enough logistical and material support to cater adequate Zoo Animal medicine and Health necessities?
	3.7 Does the Zoo Commissary (Feed store) gets timely supply of adequate quantity of good quality of feed as per requirement/ convenience of various species in a hygienic manner?
	3.8 Does the Zoo have an enforcement system to prevent nuisance and vandalism by visitors?
4. Process	4.1 Is the animal collection sustainably managed?
	4.2 Does the Zoo manage its resource sustainably (sanitation and hygiene) without detriment to the environment?
	4.3 Does the Zoo encourage stakeholders to participate in Management activities?
	4.4 Is the Zoo providing proper health care including preventive medicine as per standards prescribed in RZR 2009?
	4.5 Does the Zoo promote animal welfare by encouraging expression of natural behavior patterns and minimizes fear and distress in the animals as part of Zoo animal husbandry?
	4.6 Is the Zoo Commissary (Feed Store) stock for animal feed and supplies sustainably raised to ensure quality of feed as per requirement?
	4.7 Does the Zoo enclosures provide species-specific enrichment?
	4.8 Does the Zoo use innovative techniques/ technologies for conservation, education, research, rescue and rehabilitation efforts?
	4.9 Does the Zoo have a rescue and rehabilitation facility and adheres to rules (RZR 2009) for accepting rescued animals?

Elements	Headline Indicators
5. Output	5.1 Does the Zoo support research activities and collaborates with institutions and research organizations to address issues on Zoo Management?
	5.2 Is the Sanitation and hygiene regime followed for safety of animal, keepers and visitors?
	5.3 Is the Zoo maintaining database on animals, population dynamics and genetics of endangered species (Sch. I and II) using Zoo inventory?
	5.4 Does the Zoo follow the ethical standards and norms enlisted in the RZR, 2009 and Guidelines?
	5.5 Does the Zoo Animal keepers and supporting staff contribute to achieving animal welfare?
	5.6 Does the Zoo veterinarian and supporting staff undertake works as per protocol and procedures of RZR, 2009 for health care of animals?
	5.7 Does the Zoo show preparedness to respond to emergencies/ Disasters?
6. Outcomes	6.1 Does the Zoo maintain healthy (physically, behaviourally and genetically) animals?
	6.2 Does the Zoo effectively contribute to Conservation breeding programs? *
	6.3 Does the Zoo management caters to effective human resource development?
	6.4 Does the Zoo management caters to effective veterinary resource development, in order to ensure delivery of desired work as prescribed in section 5.7.
	6.5 Does the Zoo education and outreach programme enhance visitor-learning experience?
	6.6 Are research outcomes relevant and support Zoo management and conservation?
	6.7 Does the Zoo consciously manage activities adapting to Climate Change and prevent carbon loss?
	6.8 Does the Zoo management incorporate innovative techniques, best management practices for transforming and enhancing management outcomes?

2.7 Score Card

Each question was marked in four categories viz., Requires substantial improvement, Fair, Good and Very Good as per following:

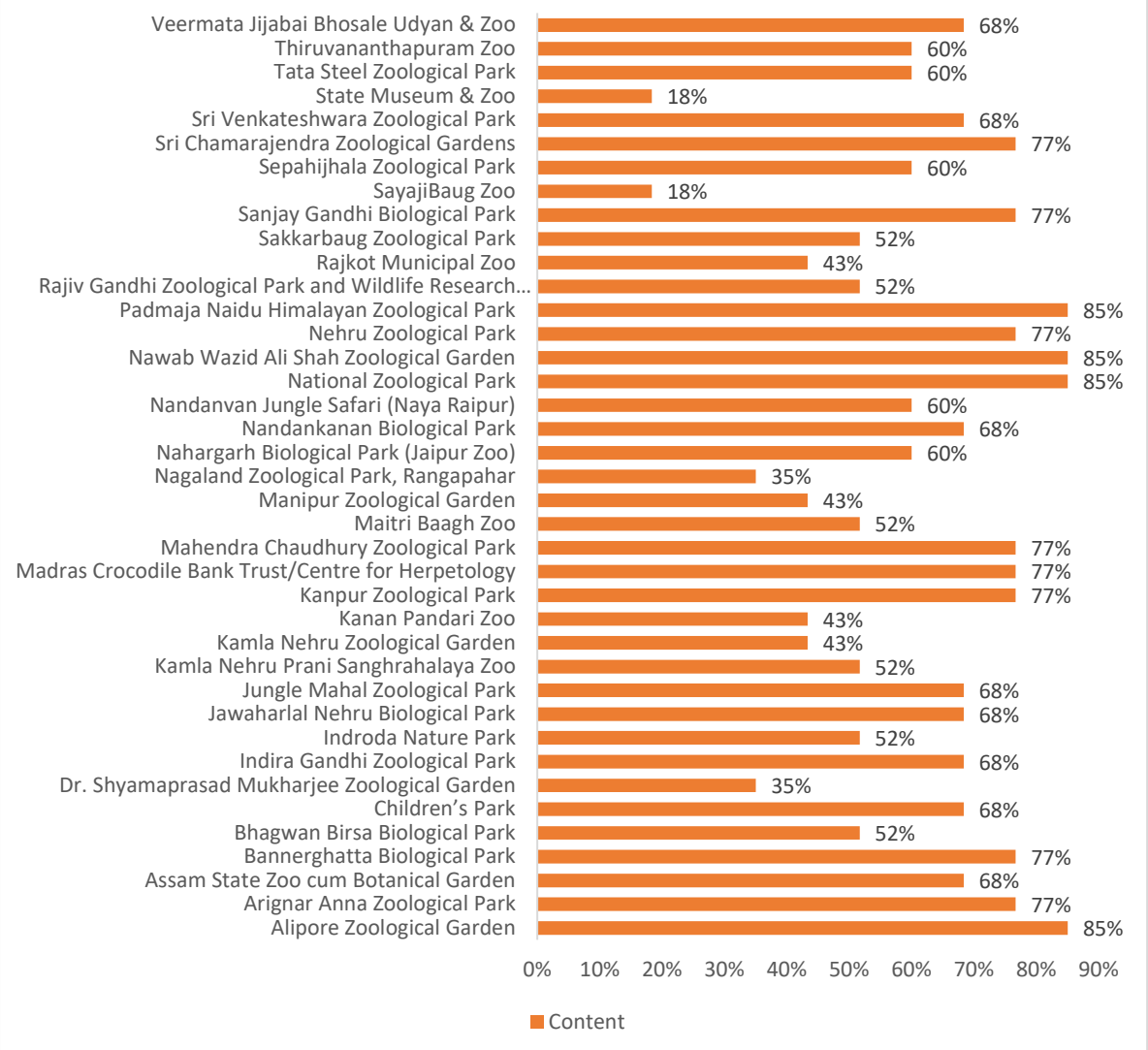
Rating	Individual score	Maximum Marks	Rating Scale
Requires substantial improvement	2.5	Upto 167	upto 39%
Fair	5	168 to 251	from 40 to 59%
Good	7.5	252 to 314	from 60 to 74%
Very Good	10	315 and above	from 75 and above

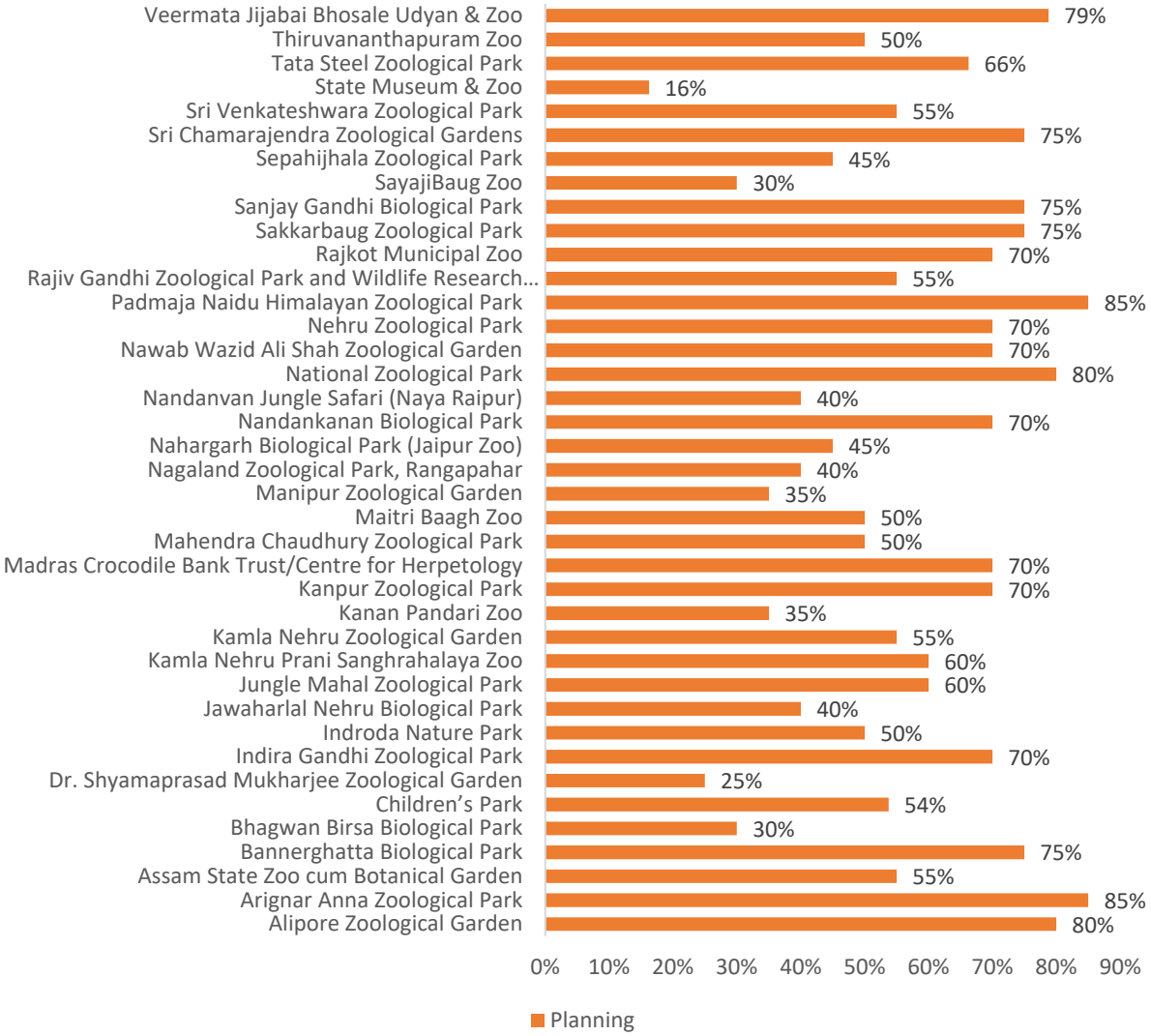


The evaluator assigned marks of all 40 indicators as per scorecard given in Table 3.

Framework Element Number	Framework Element Name	Number of Questions (a)	Maximum Mark per question (b)	Total (a x b)	Marks obtained for the Element	Overall MEE Score
1.	Context	03	10	30		**Marks obtained/ Total Marks X 100 = %**
2.	Planning	05	10	50		
3.	Inputs	08	10	80		
4.	Process	09	10	90		
5.	Outputs	07	10	70		
6.	Outcomes	08	10	80		
Total		**40**		**400**		

Scores secured by zoos for each of the elements of the MEE framework are depicted in graphs below:




Veermata Jijabai Bhosale Udyan & Zoo 79%
Thiruvananthapuram Zoo 50%
Tata Steel Zoological Park 66%
State Museum & Zoo 16%
Sri Venkateshwara Zoological Park 55%
Sri Chamarajendra Zoological Gardens 75%
Sepahijhala Zoological Park 45%
SayajiBaug Zoo 30%
Sanjay Gandhi Biological Park 75%
Sakkarbaug Zoological Park 75%
Rajkot Municipal Zoo 70%
Rajiv Gandhi Zoological Park and Wildlife Research... 55%
Padmaja Naidu Himalayan Zoological Park 85%
Nehru Zoological Park 70%
Nawab Wazid Ali Shah Zoological Garden 70%
National Zoological Park 80%
Nandanvan Jungle Safari (Naya Raipur) 40%
Nandankanan Biological Park 70%
Nahargarh Biological Park (Jaipur Zoo) 45%
Nagaland Zoological Park, Rangapahar 40%
Manipur Zoological Garden 35%
Maitri Baagh Zoo 50%
Mahendra Chaudhury Zoological Park 50%
Madras Crocodile Bank Trust/Centre for Herpetology 70%
Kanpur Zoological Park 70%
Kanan Pandari Zoo 35%
Kamla Nehru Zoological Garden 55%
Kamla Nehru Prani Sanghrahalaya Zoo 60%
Jungle Mahal Zoological Park 60%
Jawaharlal Nehru Biological Park 40%
Indroda Nature Park 50%
Indira Gandhi Zoological Park 70%
Dr. Shyamaprasad Mukharjee Zoological Garden 25%
Children's Park 54%
Bhagwan Birsa Biological Park 30%
Bannerghatta Biological Park 75%
Assam State Zoo cum Botanical Garden 55%
Arignar Anna Zoological Park 85%
Alipore Zoological Garden 80%
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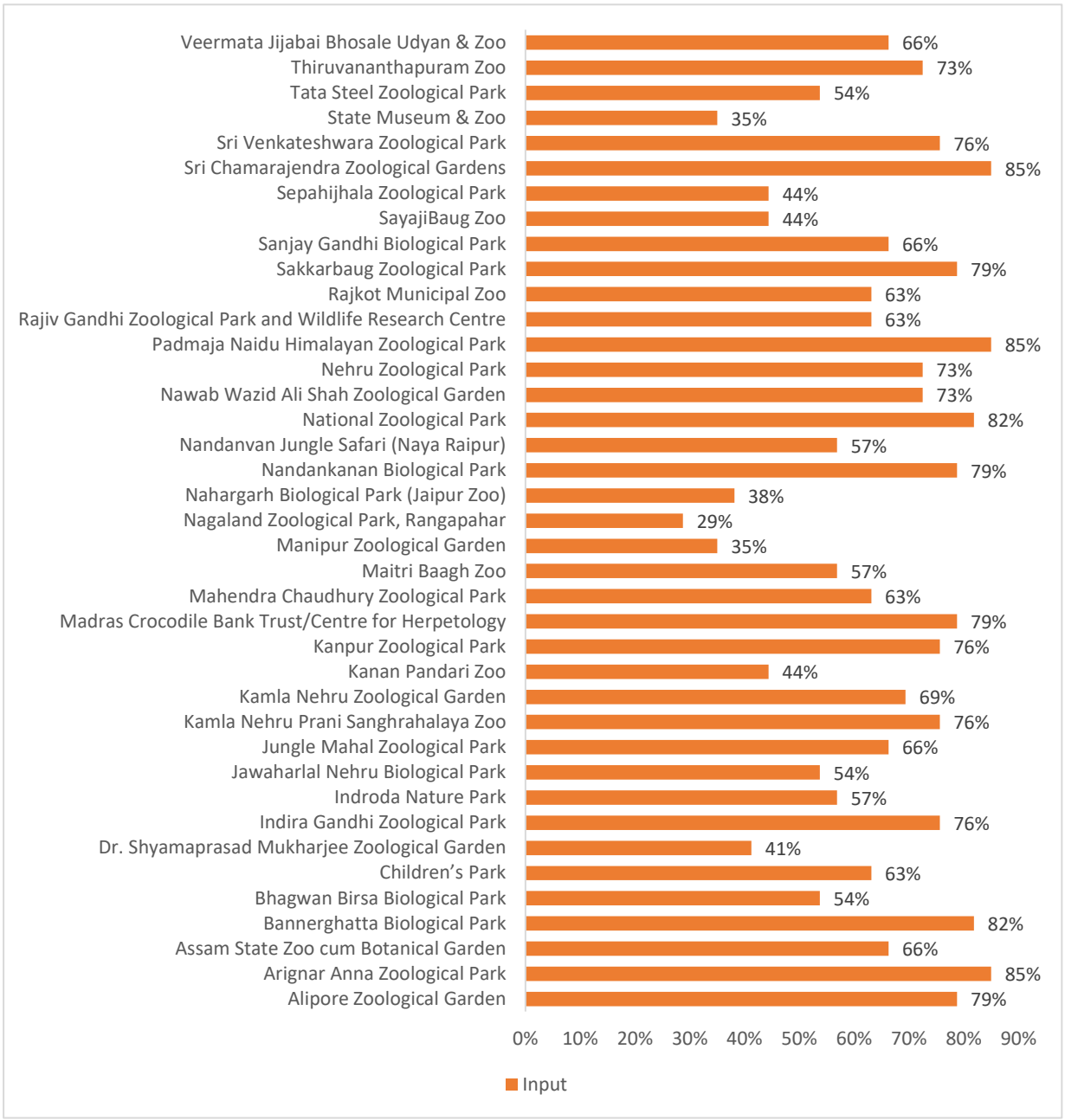
Planning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Tata Steel Zoological Park 54%
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Sri Chamarajendra Zoological Gardens 85%
Sepahijhala Zoological Park 44%
SayajiBaug Zoo 44%
Sanjay Gandhi Biological Park 66%
Sakkarbaug Zoological Park 79%
Rajkot Municipal Zoo 63%
Rajiv Gandhi Zoological Park and Wildlife Research Centre 63%
Padmaja Naidu Himalayan Zoological Park 85%
Nehru Zoological Park 73%
Nawab Wazid Ali Shah Zoological Garden 73%
National Zoological Park 82%
Nandanvan Jungle Safari (Naya Raipur) 57%
Nandankanan Biological Park 79%
Nahargarh Biological Park (Jaipur Zoo) 38%
Nagaland Zoological Park, Rangapahar 29%
Manipur Zoological Garden 35%
Maitri Baagh Zoo 57%
Mahendra Chaudhury Zoological Park 63%
Madras Crocodile Bank Trust/Centre for Herpetology 79%
Kanpur Zoological Park 76%
Kanan Pandari Zoo 44%
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Kamla Nehru Prani Sanghrahalaya Zoo 76%
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Indroda Nature Park 57%
Indira Gandhi Zoological Park 76%
Dr. Shyamaprasad Mukharjee Zoological Garden 41%
Children's Park 63%
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Arignar Anna Zoological Park 85%
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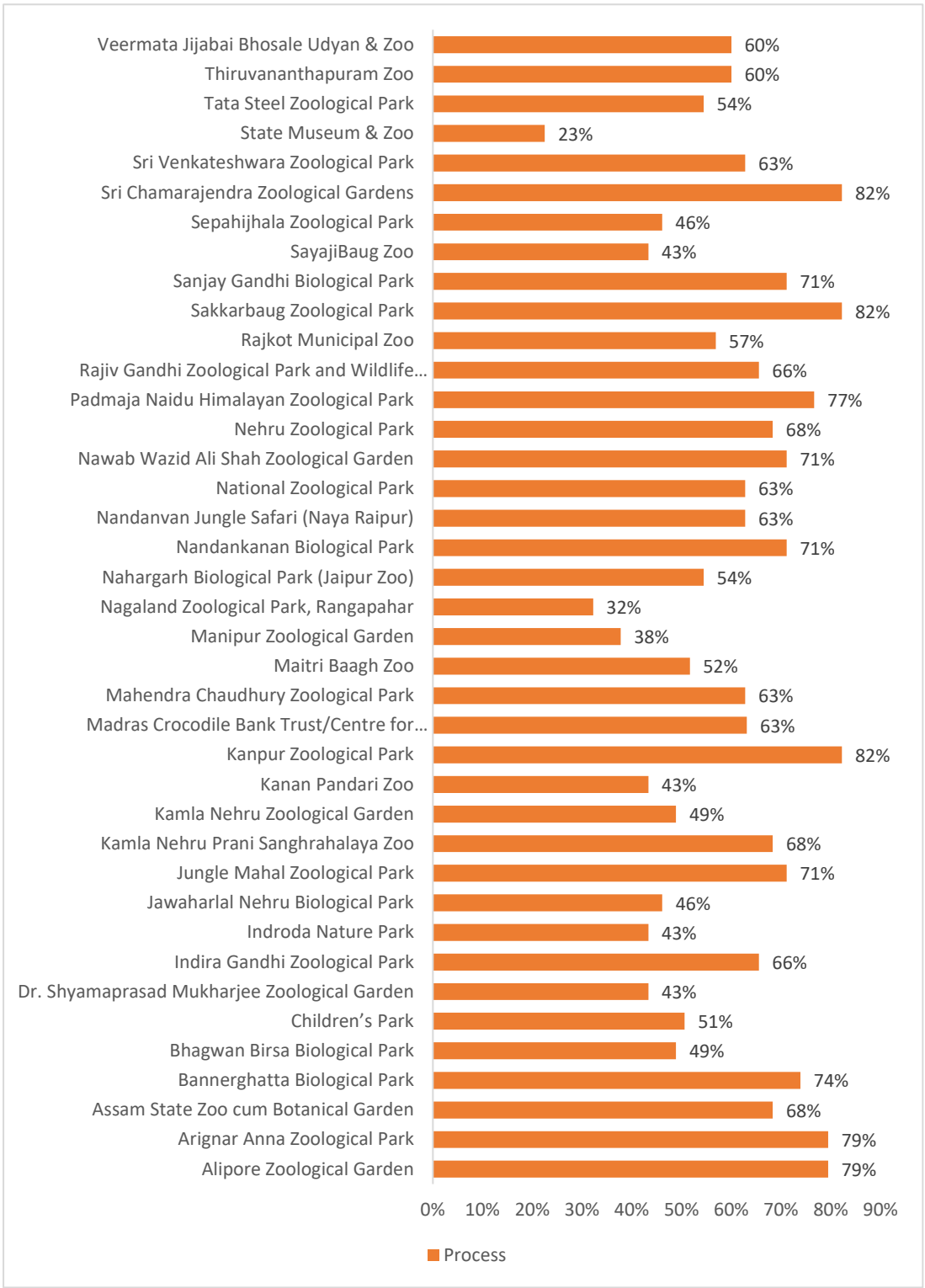
Input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Assam State Zoo cum Botanical Garden 68%
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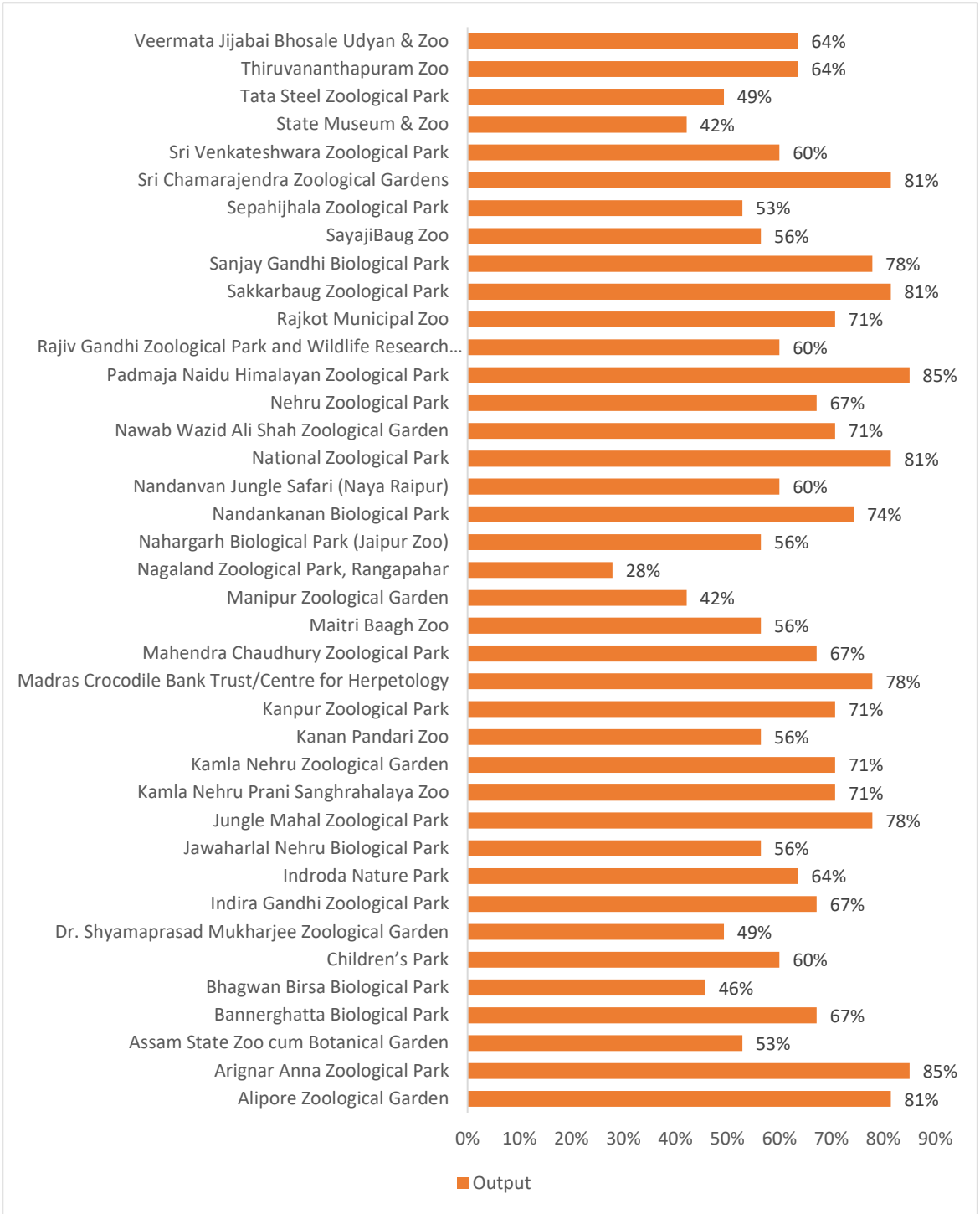
Process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Alipore Zoological Garden 81%
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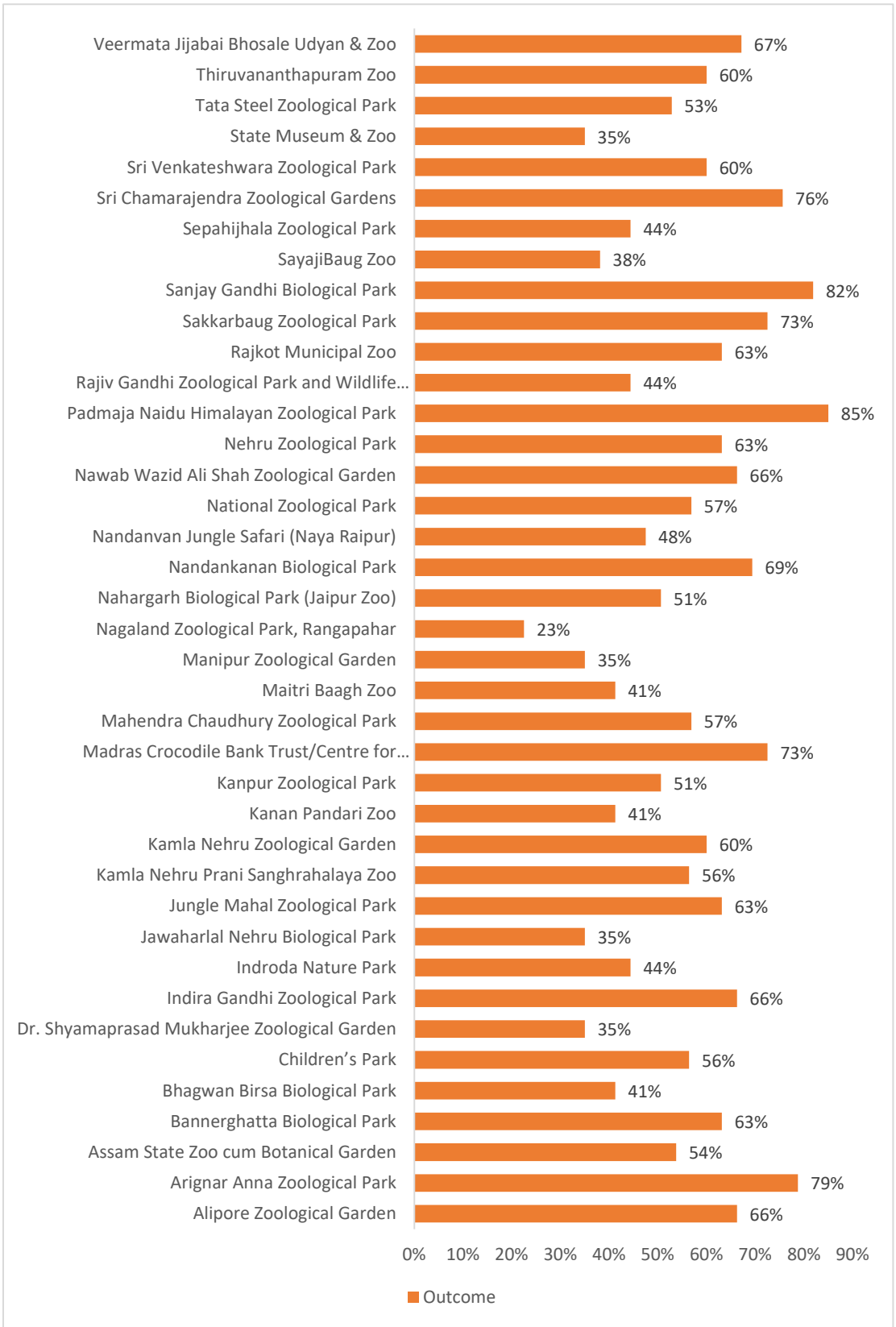
Output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Bannerghatta Biological Park 63%
Assam State Zoo cum Botanical Garden 54%
Arignar Anna Zoological Park 79%
Alipore Zoological Garden 66%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90%
Outcome

In summary the highest scores secured by the zoos in each element of the MEE Framework are below:

	Element	Zoo Name	Score
1	Context	Alipore Zoological Garden, National Zoological Park and Nawab Wajid Ali Shah Zoological Garden	85%
2	Planning	Arignar Anna Zoological Park	80%
3	Input	Arignar Anna Zoological Park Padmaja Naidu Himalayan Zoological Park Sri Chamarajendra Zoological Gardens	85%
4	Process	Kanpur Zoological Park Sri Chamarajendra Zoological Gardens	82%
5	Output	Arignar Anna Zoological Park Padmaja Naidu Himalayan Zoological Park	85%
6	Outcome	Padmaja Naidu Himalayan Zoological Park	85%

3. Results and Outcome

3. Results and Outcome

3.1 Overall results of MEE Zoo First cycle 2021

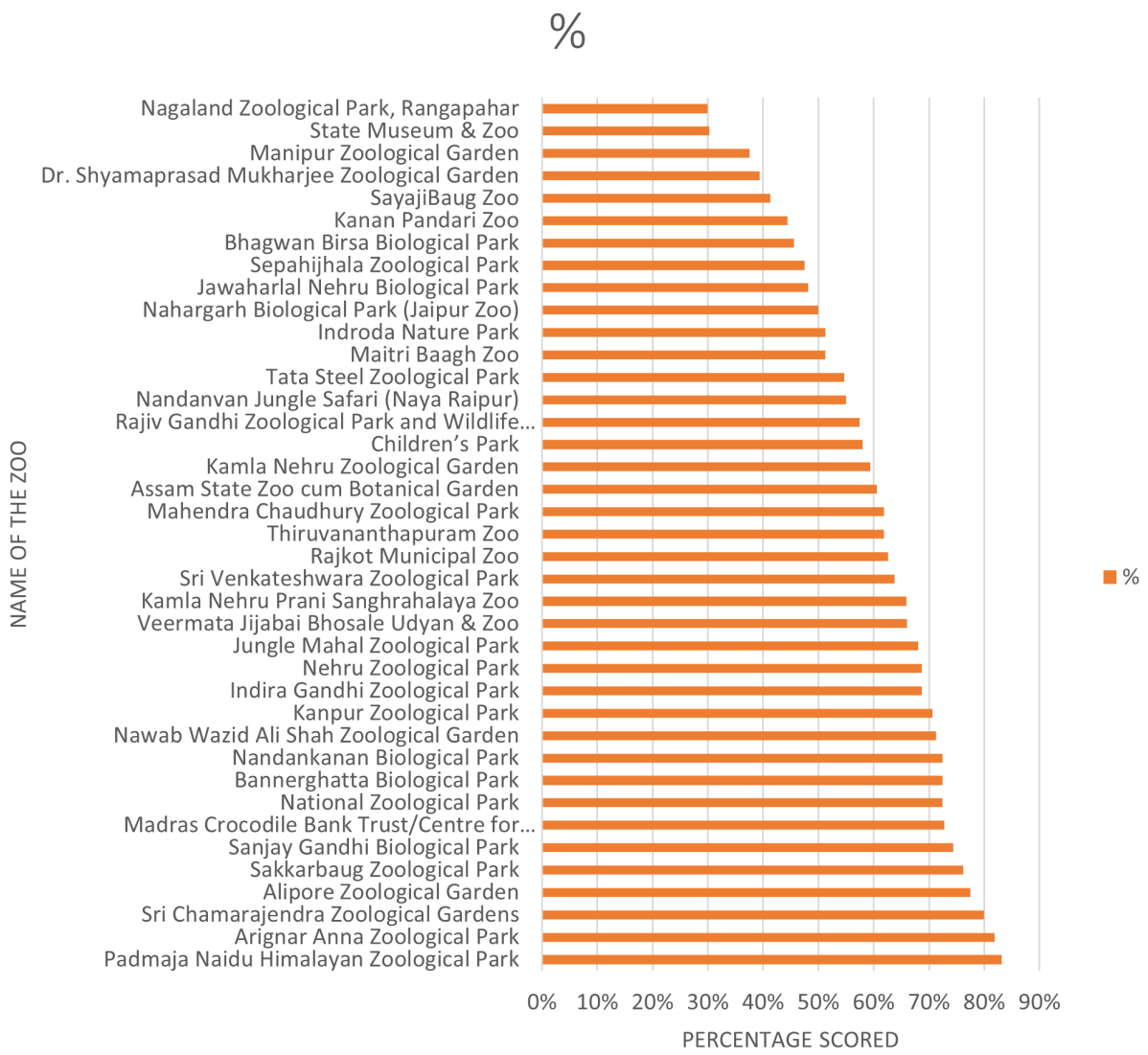
The first phase of Management Effectiveness Evaluation (MEE) was completed for 39 Zoos (16 large zoos and 23 medium zoos). The overall mean score based on evaluation was 60% with the range 30% to 83% across the 39 zoos.

5 Zoos (13%) were rated as “Very Good”

17 Zoos (44%) were rated as “Good”,

13 Zoos (33%) were rated as “Fair”, and

4 Zoos (10%) were rated as “Requires substantial improvement”.

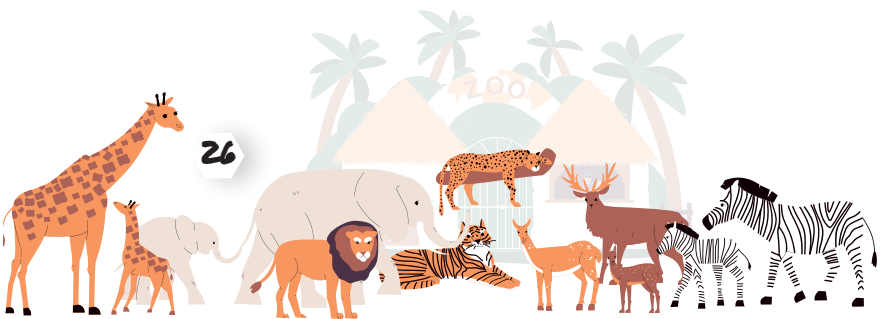


3.2 Category wise performance of MEE of Zoos

MEE phase 1 is a novel exercise in the country and the results will help in understanding the need for collaborations and interventions for achieving the vision set for by the zoos to become stewards of the ex-situ conservation.

The Arignar Anna Zoological Park, Tamil Nadu secured the highest MEE Score of 82% among the large category zoos and rated "Very Good". The Kamla Nehru Zoological Garden, Gujarat score of 59% and rated "Fair", as the assessment revealed gaps that the zoo could proactively work towards.

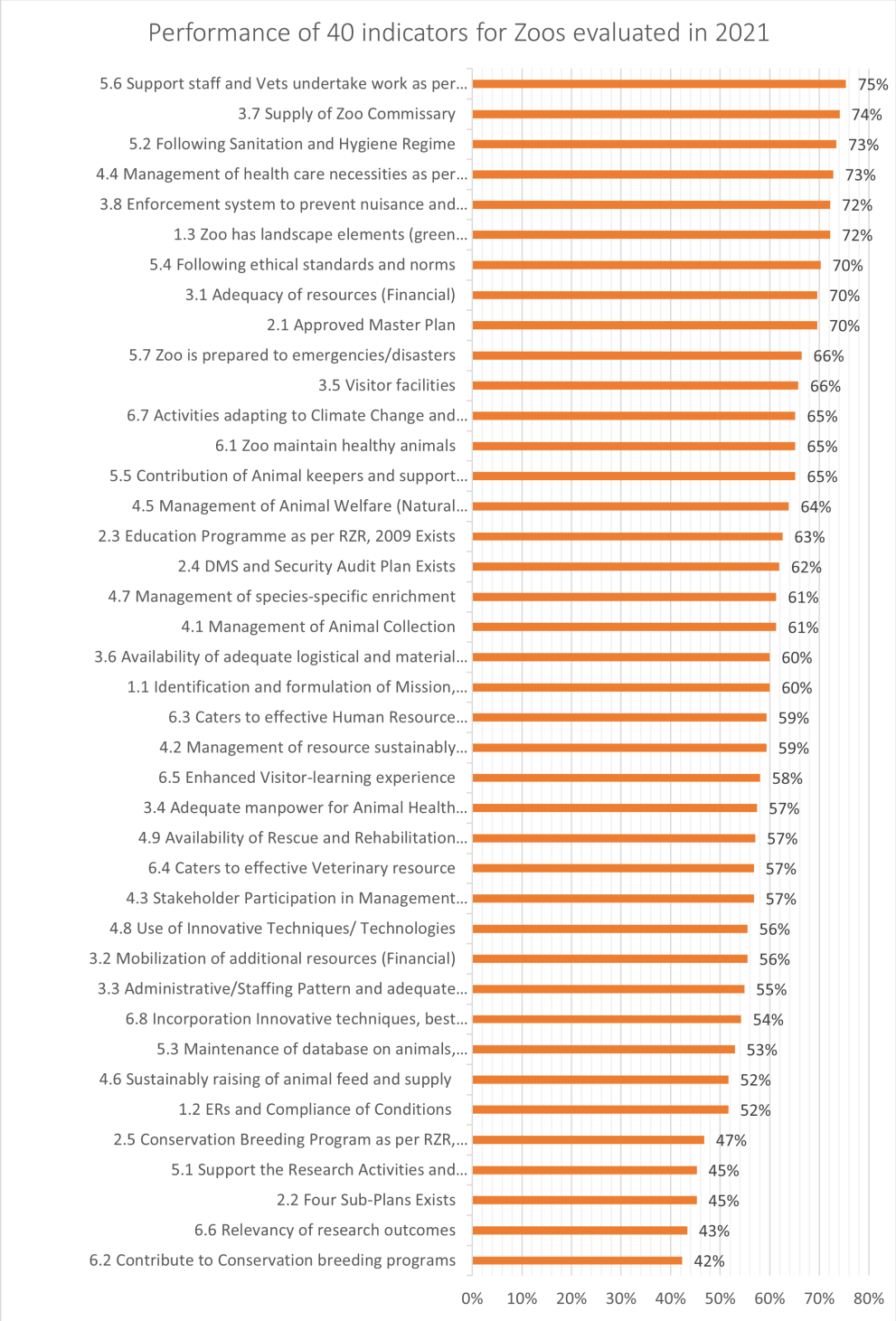
Category	State	Zoo	MEE Score (%)	Grade
Large Zoo	Tamil Nadu	Arignar Anna Zoological Park	82%	Very Good
	Karnataka	Sri Chamarajendra Zoological Gardens	80%	Very Good
	Gujarat	Sakkarbaug Zoological Park	76%	Very Good
	Bihar	Sanjay Gandhi Biological Park	74%	Good
	Delhi	National Zoological Park	73%	Good
	Karnataka	Bannerghatta Biological Park	73%	Good
	Odisha	Nandankanan Biological Park	73%	Good
	Uttar Pradesh	Nawab Wazid Ali Shah Zoological Garden	71%	Good
	Uttar Pradesh	Kanpur Zoological Park	71%	Good
	Andhra Pradesh	Indira Gandhi Zoological Park	69%	Good
	Telangana	Nehru Zoological Park	69%	Good
	Andhra Pradesh	Sri Venkateshwara Zoological Park	64%	Good
	Kerala	Thiruvananthapuram Zoo	62%	Good
	Punjab	Mahendra Chaudhury Zoological Park	62%	Good
	Assam	Assam State Zoo cum Botanical Garden	61%	Good
	Gujarat	Kamla Nehru Zoological Garden	59%	Fair



Among the medium category zoos, the Padmaja Naidu Himalayan Zoological Park, West Bengal secured the highest MEE Score of 83% and rated "Very Good". The MEE of the State Museum & Zoo, Kerala and Nagaland Zoological Park, Rangapahar, Nagaland indicated that they require substantial improvement.

Category	State	Zoo	MEE Score (%)	Grade
Medium Zoo	West Bengal	Padmaja Naidu Himalayan Zoo-logical Park	83%	Very Good
	West Bengal	Alipore Zoological Garden	78%	Very Good
	Tamil Nadu	Madras Crocodile Bank Trust/ Centre for Herpetology	73%	Good
	West Bengal	Jungle Mahal Zoological Park	68%	Good
	Maharashtra	Veermata Jijabai Bhosale Udyan & Zoo	66%	Good
	Madhya Pradesh	Kamla Nehru Prani Sanghraha-laya	66%	Good
	Gujarat	Rajkot Municipal Zoo	63%	Good
	Tamil Nadu	Children's Park	58%	Fair
	Maharashtra	Rajiv Gandhi Zoological Park and Wildlife Research Centre	58%	Fair
	Chhattisgarh	Nandanvan Jungle Safari	55%	Fair
	Jharkhand	Tata Steel Zoological Park	55%	Fair
	Chhattisgarh	Maitri Baagh Zoo	51%	Fair
	Gujarat	Indroda Nature Park	51%	Fair
	Rajasthan	Nahargarh Biological Park	50%	Fair
	Jharkhand	Jawaharlal Nehru Biological Park	48%	Fair
	Tripura	Sepahijhala Zoological Park	48%	Fair
	Jharkhand	Bhagwan Birsa Biological Park	46%	Fair
	Chhattisgarh	Kanan Pandari Zoological Park	44%	Fair
	Gujarat	SayajiBaug Zoo	41%	Fair
	Gujarat	Dr. Shyamaprasad Mukherjee Zoological Garden	39%	Requires Substantial Requirement
	Manipur	Manipur Zoological Garden	38%	Requires Substantial Requirement
	Kerala	State Museum & Zoo	30%	Requires Substantial Requirement
	Nagaland	Nagaland Zoological Park, Rangapahar	30%	Requires Substantial Requirement

A broad analysis of element wise performance indicates that there is definitive value in collective learning from institutions. The MEE framework has 40 "Head line Indicators" under six elements. All thirty-nine zoological parks were evaluated across these indicators and the result summarised. The results indicate that the zoos put in effort and resources which is denoted by the grades for the elements "Input" and "Output".



4. Conclusion and Way Forward

4. CONCLUSION AND WAY FORWARD

Evolving from a rich cultural tradition of wildlife care, Indian zoos are positioned to become some of the best in the world. As the statutory regulatory body for zoos, CZA has played an instrumental role in spearheading efforts to improve Indian zoos, particularly through its monitoring mechanism and processes.

To realise the amalgamation of science, applied research and technology and to achieve best practices in zoo operation in India, there is a need to further strengthen the efforts taken by the zoos in their various spheres of activity. It is pertinent to have a holistic view while assessing the actions needed for activities like conservation breeding, visitor experience, animal welfare etc for a progressive and a positive way forward.

The MEE-Zoo assessment has adapted the MEE (PA) methodology for developing framework for evaluation of Zoological parks. The MEE- Zoo assessment is discrete, holistic and independent to improve efficiency and understanding of zoo management to achieve the Goals and Objective of ex-situ conservation. This is an inclusive exercise with high repeatability and will be indicative of trends in development of zoo management strategies. The MEE-Zoo exercise also helps identify lacunae and project actionable points that allow for decision making in adopting the way forward and the interventions needed to achieve successful outcomes.

Best innovative Practices in Zoos

Zoos are complex institutions. Zoos will without doubt remain popular places of entertainment but must continually make adjustments to have a meaningful role in modern society. They must continually grow as organizations dedicated to conservation, education, and science, while maintaining species exhibits to reflect these ideals. Zoos are developing exhibits in a manner that is sensitive to the physical and psychologic needs of their animals. The zoos employ expert veterinarians, pathologists, nutritionists, and other professionals dedicated to the animals' care. They are institutions of education and learning, providing both on-site and outside training opportunities for their staff and using state-of-the-art electronic communication and technology and innovation to assist these efforts.

Modern zoos have become responsive to the challenges facing species in the wild, unprecedented declines in wildlife population and habitat destruction by promoting planned conservation breeding program, captive breeding for insurance populations, institutional collaborations and co-operative initiatives, and in-situ conservation strategies. Increasingly, they have to be concerned with social media presence, with raising funds from external sources through innovative ideas, and promoting cooperative interactions with other zoos to live up to their core missions.

1) At Nandankanan Biological Park, Odisha, research on conservation breeding of Indian pangolin is actively being conducted in the specially established 'Indian pangolin conservation breeding centre'. The pangolins are continuously monitored through infrared sensitive CCTV cameras and provided a near natural diet. The enclosure development is done to closely mimic natural habitats. A conservation breeding centre for long billed vultures has also been constructed, and the activity pattern of the birds are monitored through two fixed angle and one PTZ camera with infrared facility.

2) At Arignar Anna Zoological Park, Tamil Nādu, three biologists deal with matters relating to animal exchange, education, research, interpretation and training, outreach programme, zoo club, record keeping etc. They report directly to the Deputy Director and then to the Director. The primary task of the biologists is to contribute to the scientific management of animals held in the stock of the zoo by keeping a close watch on upkeep, feeding, behaviour and breeding of the animals, meticulously recording and analysing the observations and making suitable suggestions for improving the health and breeding potential of the animals, prevention of diseases and behavioural management.

3) Zoo Ambassadors Camp at Arignar Anna Zoological Park, Tamilnadu- The program is essentially an education-cum-entertainment camp for school students. It is mentored by Zoo Veterinarians, Zoo Biologists, and species specialist. Students are taken to various animal enclosures inside the zoo and briefed about the sensitization features, identification of animals, role and responsibility of the animals in the ecosystem and adaptive features. At end of the day, students are provided with activity sheets etc. and are given a certificate for becoming "Zoo Ambassador of Vandalur Zoo" along with a badge and Zoo passport. The Zoo Passport includes 10 free visits to the Zoo Ambassadors for a period of one year. Further, the students get access to Zoo Newsletter, and they can also contribute their work under Zoo Ambassador Corner of Zoo Newsletter. Students act as 'Zoo Ambassadors' and spread the message of conservation to their friends and family members. In 2020, due to the nationwide lockdown, the program was moved online. A virtual Zoo Ambassadors camp was conducted, for students from the age of 10 to 20 years. The camp featured interactive sessions in English and Tamil with field experts, which include veterinarians and biologists who work with the zoo, for an hour every day. Live as well as recorded videos of the animals and birds in the zoo were included, and also two sessions dedicated to butterflies, and the zoo's butterfly park. Participants were encouraged to ask questions to the experts and use the opportunity to learn more about the zoo. The live streaming feature available on the zoo website also gained further traction during the lockdown—with approximately 60,000-80,000 daily views. 14 different species were livestreamed, with the help of 180 cameras installed in the zoo and animal enclosures. An extra special feature was added during the lockdown, showcasing animals undertaking a particular activity, for example: elephants taking a shower

4) Nawab Wajid Ali Shah Zoological Gardens, Uttar Pradesh gives the highest degree of

importance to education, awareness, and outreach targeted at children and youth as they will be the protectors of the future. It has an advanced “Nature Interpretation Center” wherein information related to protected forest areas of Uttar Pradesh has been provided in this nature learning center and various articles related to wildlife such as skins, horns, embryos etc. have been shown and through signage also extensive information about wildlife, Information is given, The uniqueness of this Nature Interpretation is that it has a gallery of signages which are in braille , catering to the visually impaired visitors thus taking a step towards universal accessibility. The zoo also facilitates free entry to Persons with Disability and conducts regular programs for school children with special needs.

5) The Sri Chamarajendra Zoological Gardens, Karnataka is one among the few self-sustainable zoos. In the past two decades, the zoo administration has introduced many interventions, innovations and programs; from waste management policy, flexible animal adoption program. After segregation of the waste, the bio-degradable waste is used for making biogas, vermicompost, manure in the campus itself. Biogas is used in the zoo kitchen. The zoo has tie-ups with various NGOs for the recycling of plastic. The zoo is able to harvest around 79 crore litres of rain water through directed infrastructure changes. The surrounding areas of the zoo and the farmers have also benefitted by this system as no borewells go out of water during the summers, The zoo also provides RO drinking water for free to the visitors. Seventy percent of the water that gets wasted from the RO units is re-used in the zoo gardens.

6) The Madras Crocodile Bank Trust, Tamilnadu has set up a docent program to include wildlife enthusiasts from the city to get involved with zoo activities under supervision of the staff. The program has been set up in line with the guidelines put for by the CZA for volunteer engagement. The docents are volunteer educators and help engage the public in education activities and provide information about the animals displayed in the zoo.

Overall Key weaknesses

Vince Lombardi, an American football coach once said,

"Perfection is not attainable, but if we chase perfection, we can catch excellence".

Zoos in India are continually evolving and making great strides in their efforts to adopt best practices in all spheres of animal care, animal welfare, visitor experience and sustainability. This is however a dynamic process, and it is important to acknowledge and understand the lacunae.

Some of the key points for zoo management based on the MEE-Zoo evaluation:

CONTEXT

Lack of Mission, Vision, objectives and strategy that are clearly identified, defined and systematically formulated and documented, as per NZP policy

PLANNING

Lack of development of the four sub-plans (relevant plan for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management) must be prepared as per guidelines for scientific management of Zoos

No relevant Disaster Management Strategy, security plan and strong mechanism for Security Audit.

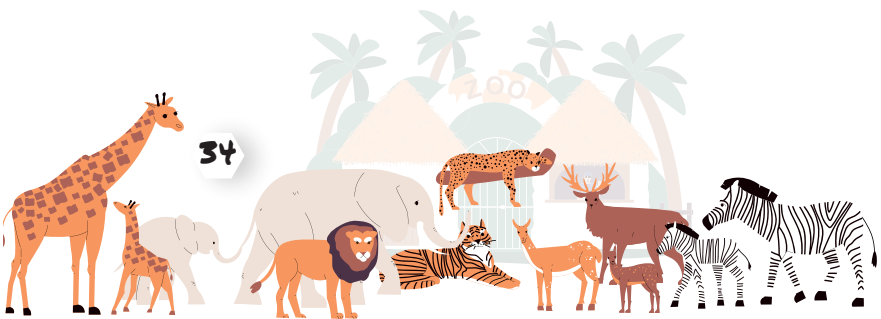
Conservation breeding program plan that has gaps in scientific planning as per approved conservation breeding plan with skilled manpower, appropriate location, funds and reintroduction as per protocol is in accordance with the prescribed standards.

INPUT

Many zoos do not have a society for management of funds and also lack advisory committees in place with specific TOR and meeting schedules.

Zoo management must try to mobilize maximum additional resource from internal and external sources for sustainable management e.g.: CSR, animal adoption programs, accepted revenue generation avenues withing the zoo.

Zoo has vacant positions that need to be filled up. The zoo must operate with sufficient staff



(technical and support staff) and personnel with adequate qualification, administrative and financial powers and specific assignment of their functions and duties, access to resources, career progression options, adequate opportunity for updation of knowledge and capacity building as per RZR, 2009 guidelines.

Zoo managements need to focus efforts on site specific, well-developed visitor facilities, universal accessibility across the zoo, transport services, catering, marketing, and promotional material (website, apps, brochures, branding of materials in the store etc).

Zoos have a hospital but need to focus efforts on developing state of the art facilities for diagnostics and treatment with large and small animal operation theatre, separate quarantine area, and post-mortem and carcass disposal facility with sufficient stock of medicine, and in-house laboratory. Additionally, zoos must have sufficient collaborations with State Veterinary Colleges or district veterinary hospitals, including a Health Advisory Committee having independent experts.

PROCESS

Zoo is lacking in plans to house all animals in appropriate social and demographic groups, allow optimum breeding, adopt adequate population control mechanisms and raise self-sustained population without any deviation from the collection plan.

Moving towards green zoos and environmentally sustainable operations, Zoos must develop a comprehensive garbage disposal system, a strategy for recycling of wastewater, energy conservation, explore renewable energy sources and regularise bio-hazardous/ veterinary waste disposal with the help of innovative technologies.

Zoos need to develop novel and innovative approaches to locally source some of its food for animals (fodder, tree fodder, greens, rats and insects) and deal with the challenges of limited space to grow special feed.

As developing modern zoos, it is pertinent to consider implementation of visitor friendly, smart applications for sharing information's on maps & signage, keepers talk, visitor guidance and ticketing. Other technological innovations in conservation education related to information kiosk, touch screens with event information, and feedback, web-based livestreaming of animals, virtual reality, augmented reality, electronic bar-code-based entry gates, technology-based devices for animal welfare in the form of sprinklers, water blasters. Security of animals may also be considered. Apart from this research tools available in Zoos are camera traps and CCTVs for monitoring animals, for security etc. Any technology for visually impaired, physically challenged and for visitors with special needs.

OUTPUT

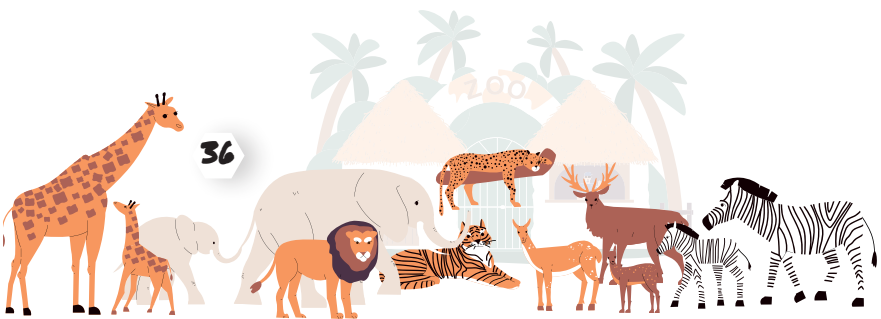
Zoos are lacking in setting priorities for research by in house teams, collaborations with research bodies and organisations, sharing data to facilitate research, disseminates and publication of research and zoo work across appropriate platforms.

Most zoos appear to be lacking a comprehensive database (physical/ digital) for animals in its collection in standard formats as per CZA norms, with permanent individual identification for animals for maintaining studbooks and records. Zoos are not actively pursuing genetic and demographic analyses for most animals which are great tools for developing Species Recovery Plans.

OUTCOMES

Zoo management must make efforts to provide opportunity for building leadership, capacity enhancement, specialised training, career progression and raising motivation levels of Staff and addressing welfare issues.

Due to lack of research priorities zoo also lack a comprehensive research plan that can feed data into Zoo management and conservation, captive/ conservation breeding, also aid in linking ex-situ and in-situ conservation initiatives.



Outcomes of MEE of Zoos and way forward

Managing a zoo requires balancing the provision of excellent animal management and care with an optimal visitor experience and quality customer service. In addition to standard business management practices, zoos also need to consider the vital element of collection planning. The MEE-Zoo assessment at its core is a discrete, holistic and independent exercise and has put forth with clarity the actionable points (annexure 1 and 2) that the individual zoos can focus attention and prioritise in their operations planning.

MEE-zoo is an inclusive exercise the assessment is based on information and documentation provided by the zoo and a detailed site visit. The exercise will generate base line data for comparison and over the years, with repeated evaluations will indicate a trend that will provide in-sights for better decision-making and ex-situ conservation initiative planning. It can also focus management efforts when resources are constrained.

The actionable points derived from the MEE-Zoo evaluation, along with the pillars of change indicated in the Vision Plan for Indian zoos (2021-31) can become the catalyst for the transformation, build innovation and leadership and help zoos deliver experiences that inspire visitors to take conservation action and affirm deeper community connect.

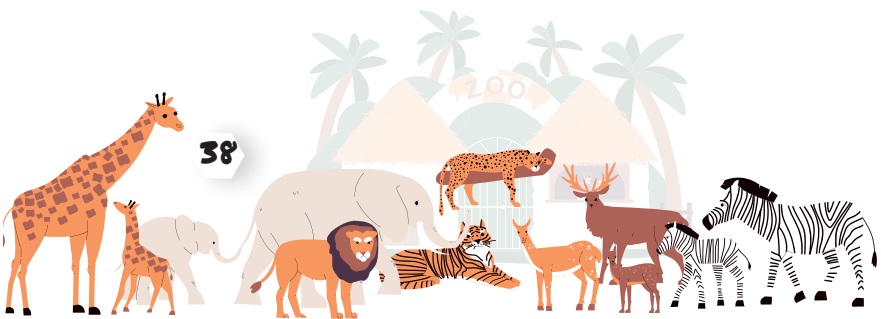
With increasing interest from both the public and from within institutions themselves in continually improving the zoo management standards, the use independent, evidence-based assessments is crucial. The establishment of standardized guidelines for the assessment would be beneficial for data comparison and sharing. As the process evolves, ongoing iterative modifications can be implemented as evidence and experience is gained.

Actions to be taken by zoos- Way forward.

- In order to put in place, the best practices in all aspects of management, there has to be a effective and all round amalgamation of science, applied research and technology grounded in evidence based conservation actions.
- Create a comprehensive masterplan envisioning the development and growth of the zoo over a 20-year period. This should include a detailed collection plan taking into account space availability, number of animals per species (including potential breeding), theme, and local climatic conditions. The masterplan must have a clearly stated mission, vision and objectives and include plans for education, enrichment, disaster management and landscape management.
- Create a comprehensive conservation breeding program plan inclusive of genetic profiling for the identified species with clear indication of founder stock, animal marking, availability of skilled manpower, appropriate off exhibit location, the identification of founder stock, demographic and population management, behavioural management, nutrition,

health care, record keeping, research, identification of a plan for animal release after a feasibility assessment, plan for soft release, community engagement at place of release. The zoos may initiate linkages with in-situ conservation initiatives and adopt the One Plan approach for long term planning for species conservation.

- Create infrastructure for animal housing that account for species-specific biological requirements and can augment the overall wellbeing of the animals along with developing a species-wise, dynamic environment enrichment plan. The design elements must effectively incorporate aspects of 'landscape immersion' (incorporating natural and cultural elements of animals' native land) and 'abstract ecology' (representing elements of animals' native habitat). To assess the functionality of the infrastructure and any enrichment provided within, zoos must routinely assess stress levels using routine behavioural monitoring and/or minimally invasive stress hormone estimation.
- Information/data management and recordkeeping is key to effective action in animal care. Zoos must use the mandated software(s) and for additional features and analysis, zoos may use globally recognised data recording systems or develop and manage programs independently to suit their needs.
- Research is an important initiative in a zoological institution. Zoos must recruit mandated technical and scientific personnel (as per RZR, 2009), encourage research and attempt a research plan. Research at the zoo can strengthen management initiatives and address welfare concerns, ensuring better care for animals as well offer further insight into the behavioural and psychological trends in animals. Dissemination of research by publication across available academic and popular platforms is paramount for its critical appraisal, future progression, and for generating continued interest in the work.
- Interpretative learning at the zoo relies heavily on immersive habitat experiences and creating memorable multi-sensory experiences. Various interpretative strategies may be included in the overall education strategy of the zoo including a dedicated interpretation centre, interactive signage, developing relevant IEC material etc. Increasingly, the use of technology as a facilitator of inquiry and a tool for interpretation has gained popularity across the world.
- Zoos can explore research collaborations between institutions, scientists and volunteers that expand opportunities for scientific data collection while also providing access to this information to the community. Citizen science programs, usually addressing questions that require long-term, large-scale data collection, are a great way for people to build a positive relationship with the zoo and to contribute to science.
- Visitor experience encompasses a visitor's emotions, beliefs, preferences, perceptions, physical and psychological responses, that occur before, during, and after the visit. Continued visitor engagement surveys contribute to understanding visitor interaction with

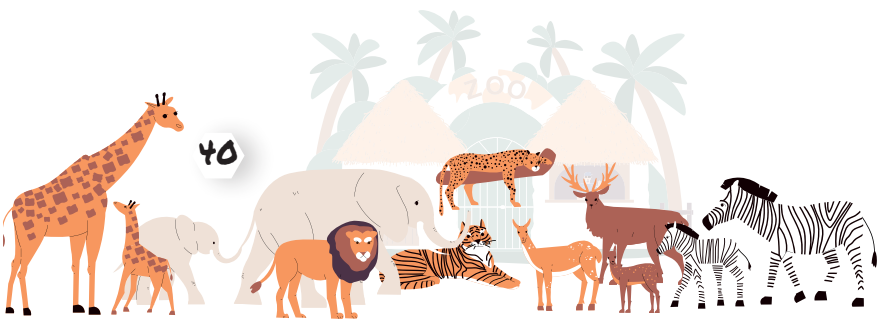


the zoo environment helps in better identifying people's needs, planning and designing of animal exhibits, providing adequate amenities, development of business and marketing strategies including the development of curated experiences, memberships and loyalty programs.

- There are continual advances in technology and digital interpretation applicable to zoo management. The use of digital technology can help zoos to expand outreach programmes, improve animal welfare, and achieve overall efficiency. Interactive technological systems (websites, zoo apps, virtual zoo tours etc) can offer opportunities to enhance visitor experience by expanding the dimensions of the encounter.
- Zoos need to garner a steady stream of revenue to effectively fund their operations. Gate revenue is the primary source of income for zoos, coupled with support from the government agencies and subsidiary sources such as bank interests, sale of items, leases, rents, and penalties.
- Zoos are complex institutions, requiring a wide range of skills and expertise for optimal functioning, including wildlife management, specialised veterinary care, administrative experience, communication skills and more. Zoos must thus invest in developing skilled and motivated teams and ensure appropriate career enhancement opportunities and skill enhancement training.
- Zoos must aim become a part of the community that embodies the principles of sustainable functioning. The functions of the institution must aim to synergise the elements of soil, water, energy and waste and make this demonstrable by developing a comprehensive environmental sustainability strategy incorporating water reuse, filtration and recycling, thoughtful consumption and reduction of water pollution, and increase in recharge of the ground-water. Zoos can devise innovative methods for disposal and treatment of all types of waste- both organic and in-organic utilizing concepts of circular economy.

References

1. Hockings, M., Stolton, S., Leverington, F., Dudley, N., &Courrau, J. 2006.Evaluating Effectiveness: A Framework for Assessing Management Effectiveness of Protected Areas.2nd edition. Gland, Switzerland and Cambridge, UK: IUCN. xiv + 105 pp.
2. Hockings, M., James, R., Stolton, S., Dudley, N., Mathur, V., Makombo, J., Courrau, J., Parrish, J., &Patry, M. 2008. Enhancing Our Heritage Toolkit: Assessing Management Effectiveness of Natural World Heritage Sites. World Heritage Paper 23. Paris: UNESCO World Heritage Centre.
3. Leverington, F., Hockings, M., & Costa, K.L. 2008. Management Effectiveness Evaluation in Protected Areas: Report for the Project 'Global Study into Management Effectiveness Evaluation of Protected Areas'. Gatton, Australia: The University of Queensland, IUCNWCPA, TNC, WWF.Mayne, J. (2008) Building an evaluative culture for effective evaluation and results management. ILAC Brief (20) 4 p.
4. Mathur, V.B. 2008. Management Effectiveness Evaluation (MEE) of Protected Areas Network in India: Recent Experiences. Implementation of the CBD Programme of Work on Protected Areas: Progress and Perspectives. Abstracts of poster presentations at the second meeting of the Ad Hoc Open-Ended Working Group on Protected Areas, 11–15 February 2008 in Rome, Italy. Technical Series No. 35, 106 pages. Secretariat of the Convention on Biological Diversity.
5. Mathur, Vinod B., Nasim A. Ansari, Onial, M (2019). "Protected areas management in India: Challenges and way ahead." SPECIAL ISSUE ON ENVIRONMENT: 101. Available at https://www.iccfg.net/files/specialissuesofjournal/Volume%2018%20-%20January%202019%20%20Special%20Issue%20on%20Environment.pdf#page=103
6. Mathur, V. B., A.K.Nayak and N.A. Ansari 2019. Fourth Cycle of Management Effective Evaluation (MEE) of Tiger Reserves in India, 2018. National Tiger Conservation Authority and Wildlife Institute of India, Ministry of Environment, Forest and Climate Change, Government of India Pg 212.
7. Pomeroya, R.S, Watson L.M., Parksc J.E. and Cidc G.A. 2005. How is your MPA doing? A methodology for evaluating the management effectiveness of marine protected areas. Ocean & Coastal Management 48: 485– 502
8. Tyagi PC, Yadav SP, Ansari NA, Ghosh S (2020). Guidelines, Criteria and Indicators for Evaluation of Indian Zoological Parks through Management Effectiveness Evaluation Process (MEE-ZOO). Wildlife Institute of India and Central Zoo Authority, Ministry of Environment, Forest and Climate Change, Government of India.
9. Vision Plan-Zoos (2021) Vision Plan for Indian Zoos and Strengthening of Central Zoo Authority (2021-2031). Ministry of Environment, Forest and Climate Change, Govt of India.



Action to be Taken

Action to be Taken

Group: Large Zoos

Arignar Anna Zoological Park, Tamil Nadu

1. The Health Advisory Committee is to be constituted as per Rule 10, Sub Rule 31 of Guidelines for the Establishment and Scientific Management of Zoos 2008.
2. Zoo must consider options for green energy, rainwater harvesting/water recycling, alternate sources of generation of energy.
3. Standoff barrier above 75 centimeters be reduced and Chain link fence inside open moat should be removed.
4. Live feed rearing centre be developed.
5. With relation to the ongoing Conservation Breeding programs the zoo may initiate planning for release of animals in the wild. The plan should include details of genetic profiling with clear identification of founders, animal marking, animals to be released, survey of release site, soft release, community engagement around areas of release etc.

Assam State Zoo cum Botanical Garden, Assam

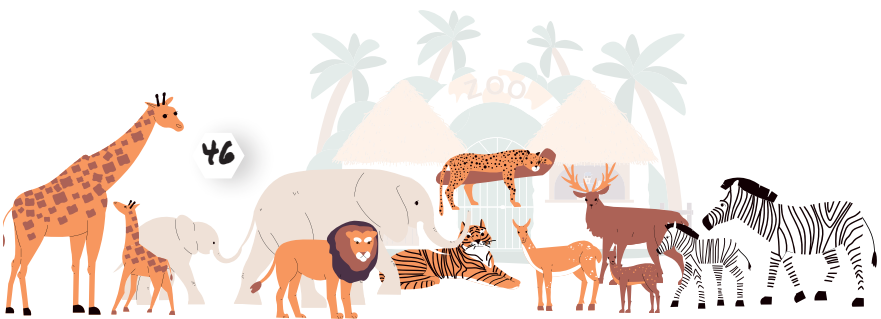
1. The zoo management must put together a detailed masterplan with sub-plans (of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management), plans for research, and a disaster management plan. Further the masterplan must include detailed collection plan with justification and detailed layouts as per the checklist.
2. The zoo has no autonomous or semi-autonomous financial powers. There is the need of a registered Society for the effective management and overall development of the Assam State Zoo-cum-Botanical Garden, for primary management of a revolving fund generated from the revenue, funds etc. within the framework of the rules of the Zoo society. The fund so generated will be in the form of a Corpus to be utilized for meeting the emergency financial requirements ensuring the overall development of the Zoo. Such a registered society already exists in the name of "Zoo Society', which can be renamed and mandated as 'Society for Management and Development of Assam State Zoo cum Botanical Garden'. The fund may be then used for enclosure construction and maintenance and overall upliftment of the Zoo.
3. The waterbodies in the zoo need strengthening in terms of natural resource management and infrastructure.
4. The zoo must engage technical staff viz: curator, biologist, education officer to support the officer-in-charge in carrying out the responsibilities of housing, upkeep and health care of zoo animals, research and visitor education.
5. Considerations of addition of Interpretation Centre, Cloak room, BOV in the interest of universal accessibility (for all ages, people with disabilities etc).
6. Consideration of putting in place measures for rain water harvesting or other water recycling/ storage and ground water recharge projects and renewable energy.
7. Set up better Quarantine Centre and Isolation Facilities for Rescue operations, Laboratory facilities, Post-mortem unit, and Carcass Disposal area.

Bannerghatta Biological Park, Karnataka

1. Modernization of the zoo in accordance with the revised approved masterplan is pending completion. Appropriate additional planting in the zoo premises is required to be done. Open areas to be planted with suitable species and better managed.
2. Significant improvement is needed in drawing up of specific plans for education, conservation breeding, research and disaster management.
3. There is scope for further improvement of zoo visitor amenities.
4. There is scope for further improvement to provide adequate Zoo Animal medical care and meet the required health necessities.
5. There is scope for further improvement in the provisioning of food to animals in an adequate quantity and in a hygienic manner.
6. There is scope for further improvement in managing the animal collection in a scientific manner
7. Provisioning health care including preventive medicine as per standards prescribed in RZR 2009 needs improvement.
8. More vegetative screening of animal houses, more planting between the enclosures and more enrichment work in a naturalistic manner should be done.
9. Research priorities based on management requirements should be identified and systematic studies carried out and results published. It is suggested that a research advisory committee for the zoo is constituted for identifying research priorities and coordinating execution of such projects.
10. Further improvement is needed in the understanding of biology, behaviour, nutrition, maintenance, safety and hygiene regulation of animals and recordkeeping in the Zookeepers and supporting staff.
11. Preparedness to respond to emergencies/ disasters requires further streamlining with proper planning, training, practicing drills, equipment etc.
12. Human resource development needs more focus from zoo management.
13. Effective veterinary resource development, in order to ensure efficiency during emergent situations needs further improvement.
14. Further strengthening of zoo education is required.
15. There is ample scope for improvement of expanding the activities for adaptation as well as mitigation of climate change consequences.

Indira Gandhi Zoological Park, Andhra Pradesh

1. A detailed Conservation Breeding Plan (setup, founders, plan for soft release, community engagement etc) should be prepared.
2. Before planning release of the dhole from the CBP, genetic profiling should be done through an appropriate institution e.g., LaCONES and Studbooks data should be updated.
3. Appropriate enrichment based on biology of each species must be put in place for all the animals housed in the zoo. Enrichment inside night houses e.g., Tiger and Primate and cubicles in the Inpatient ward enclosure should be done with appropriate structures.
4. Feed to be hung at scattered points for browsing animals – Sambar deer, etc., and trees inside the arena should be given protection by providing tree guards.
5. Gharial's enclosure should have an area covered with a layer of sand at the point of basking.
6. Restrict the visitor's viewing area to 20–30% of total enclosure boundary by growing hedges. There should be natural screen of live hedges between two adjacent enclosures and increase distance between moat wall & Stand of Barrier wherever possible. Also, to make effort to cover/ camouflage the cement structures including night shelters by planting suitable & appropriate species including bamboo.
7. Circulation pattern for visitors should be one way during all zoo working days.
8. Efforts should be made to pair up single sex animals.
9. Quarantine facility for herbivores needs to be established.
10. The zoo management must attempt to fill up vacant posts (Junior Veterinary Officer, Range Officer, Sr. Assistant, Jr. Assistant) and create a second line of trained personnel who would then take over for posts that will be vacated on retirement.
11. As the zoo is situated at Cyclone prone area it needs a strong disaster management plan.
12. MoU with Andhra University & IISER, Tirupati should be expedited.
13. The Zoo should obtain Beef in the form of whole carcass and then process it at Beef room in the store. Every section of the Store house rooms should have appropriate signages.

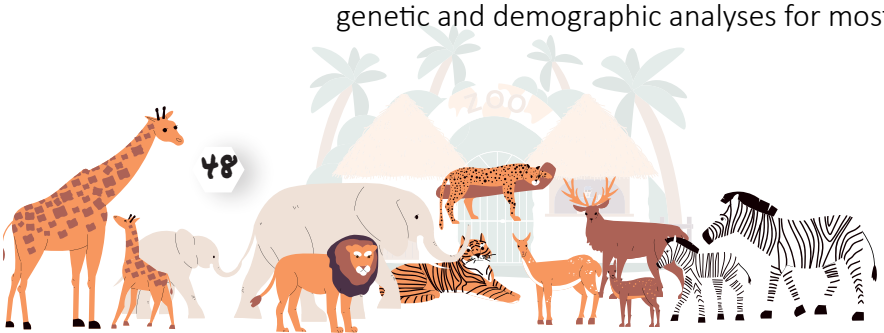


Kamala Nehru Zoological Garden, Gujarat

1. Vision statement should include ex-situ conservation of the important fauna of the Greater Gir landscape. Mission should include improvement of the upkeep, housing, health care of the animals and should include way forward to achieve. Strategy needs to be spelt out clearly.
2. Zoo management may consider setting up a society for management of funds and also putting advisory committees in place with specific TOR and meeting schedules.
3. Buildings and architecture must merge with the landscape for better ambience and aesthetics.
4. Masterplan validity expires in 2022 and zoo management must do a review and submit fresh detailed masterplan for scrutiny to the office of the CZA.
5. Zoo must develop detailed plans for education, conservation breeding, research, disaster management along with collaborations and include the same in the masterplan.
6. Zoo management must attempt to fill the 15% vacancies available as per extant norms and guidelines.
7. Zoo management must make all efforts to upgrade standards of hygiene in food preparation, storage distribution and all other areas of the zoo.
8. Zoo management may consider involving volunteers post training in different sections like Veterinary, education, animal husbandry etc.
9. The management should take steps to up-grade the knowledge of keepers about species and animal welfare practices and data management in the form of keeper diary.
10. Zoo to focus on species specific enrichment with provision to make seasonal changes for all enclosures.
11. Technology and innovation may be incorporated to enhance the visitor experience
12. Zoo to focus on genetic profiling of animals especially those that are part of the planned Conservation breeding program, maintaining animals in viable social groups and maintaining adequate sex ratios in the populations.
13. CB species must be maintained in off display enclosures for breeding and to prevent habituation with people.

Kanpur Zoological Park, Uttar Pradesh

1. Zoo should have a strong and relevant Disaster management strategy with security plan and a strong mechanism for Security Audit.
2. The income of the Zoo needs to be increased for financial sustainability. The Zoo must mobilise additional resources (financial through CSR) and generate funds for financial sustainability
3. The zoo authority should fill the vacant post as per CZA guideline.
4. For visitors' facility, more battery-operated carts are required.
5. The zoo hospital needs upgradation in terms of better equipment for diagnostics and treatment procedures and space availability
6. The feed preparation room needs upgradation with a greater number of freezers to store meat for the animals and additions like wooden planks to avoid insect infestations and rotting due to humidity and fungus.
7. Zoo must have a comprehensive garbage disposal system, a strategy for recycling of wastewater, energy conservation and bio-hazardous/ veterinary waste disposal and have an innovative science-based management plan.
8. Appropriate nutrition and diet sheet for all animals especially individual bird species must be put in place with immediate effect. Species specific enrichment must be incorporated into all enclosures to avoid stereotypy and improve welfare standards.
9. Height of the wall of some enclosures especially, Himalayan black bear and barking deer needs to be increased. Native species of trees including fruit bearing trees may be planted in the zoo premises to improve the overall ambience.
10. All signages should be bilingual.
11. Mates/companion animals must be found for all single sex animals in the zoo.
12. Quarantine facility need to be established for herbivores and carnivores and there should be a separate ward for sick animals. rescue and rehabilitation of wild animals needs more focus. Zoo must have a rescue facility, to accept rescued animals, and house them in appropriately designed enclosure for lifetime care as per rules.
13. Safety barrier has to be fixed in the toy train platform to avert accident.
14. Rock pigeon (feral) and free ranging peafowl are increasing in number, and these may be monitored and regulated.
15. There should be collaboration with various colleges and universities to take up wildlife research more focus on research and collaboration with technical universities for P.G. and PhD research work.
16. The zoo needs to purchase a new incinerator for proper disposal of carcasses
17. Facility for veterinarians must be strengthened.
18. Zoo must maintain a database (physical/ digital) for animals in its collection in standard formats as per CZA norms for maintaining studbooks and carry out genetic and demographic analyses for most animals.



Mahendra Chaudhury Zoological Park, Punjab

1. Zoo must constitute a Health Advisory committee.
2. The Education and enrichment plan must be consolidated and incorporated as a sub plan of the Master plan. Both these plans require substantial improvement. Zoo Landscape elements have been indicated in a sketchy manner and need to be consolidated into a plan.
3. Zoo has been assigned the task of conservation breeding of Falcon (coordinating Zoo) and Tiger (participating Zoo) and has carried out surveys for capture of founder population of falcon in accordance with the permission of Chief Wildlife Warden, Punjab. A conservation breeding plan for the species assigned to the zoo, Shaheen Falcon (coordinating Zoo) and Tiger (participating Zoo) must be prepared with details of founder stock, demographic and population. Research in CB must be given priority.
4. Disaster Management strategy, contingency plan has to be drawn up with focus on management action, equipment, vehicle availability and practice drills to counter any emergent situations. Security review and audit should be an essential part of management.
5. The zoo management must draw up a detailed budget for operations and development criteria and ensure availability at appropriate time. The zoo has adequate funds for upkeep and maintenance and is linked to priority activities as identified in the master plan but not released in time. The budget for development needs as per proposed budget in draft master plan, is not sufficient.
6. The zoo management must make a strong move to fill up the vacant positions and engage appropriate technical personnel as per CZA guidelines for zoo activities and to help the officer-in-charge in discharging duties. Regular capacity building programs must be available to the staff for upgradation of knowledge and skill.
7. Zoo must set priorities to conduct research by in-house team or in collaboration with research bodies and organisations, colleges. A volunteer program can be put in place as per the CZA guidelines.
8. The zoo must develop a quarantine area and appropriate housing for animals. The zoo must accept animals on rescue only after appropriate facility to house and maintain animals are available.
9. The Zoo should adopt innovative techniques/technologies in several spheres of its management
10. The zoo must attempt at putting together the genetic profiles of endangered species and using the data to maintain and update data in physical and digital form (ZIMS)

Nandankanan Biological Park, Odisha

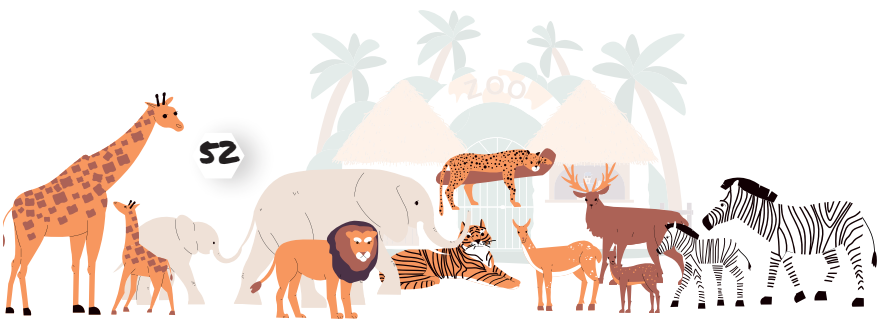
1. Mission, Vision, objectives and strategy must be clearly identified, defined and systematically formulated and documented, as per NZP policy.
2. Eviction of unauthorized vendors from entry gate area
3. Availing the services of zoo volunteers & their involvement in zoo management activities
4. Acquiring animals to make pairs of 26 species of single animals at the earliest
5. Advanced training for veterinary doctors in wildlife health aspects
6. Liquid waste disposal system has to be improvised
7. Compliance to remaining observations of CZA while reviewing the recognition of zoological park

National Zoological Park, Delhi

1. Breeding program must be scaled up for smaller mammals with weight less than 10kg.
2. Scope may be explored to entice corporates for funding breeding of critically endangered species under CSR.
3. There is scope for linking with active zoology department of colleges and institutions for collaborative research by PhD and MPhil students.
4. Directorate of Research: The availability of more than one thousand animals and birds in captivity in NZP gives a leverage to keen researchers in many educational institutions of NCR. It can provide a platform for specialised research with ex-situ research opportunities to college and school students/researchers and wildlife volunteers on living specimens of keystone species of select orders. This could be undertaken by means of MoUs with the institutes and inviting keen individuals. There is a need to establish a stakeholder group connectivity mechanism which would increase the flow of information about select species from keen wildlife and nature observers of NCR.
5. Breeding Facility Center: Zoo is currently involved in conservation breeding in a very limited way by fulfilling the requirements of Management plan. Zoo has to be perceived as an institution having major positive impact on the ecosystems by actively facilitating breeding of endangered species and rewilding them in their natural habitat for effective conservation purpose. It may be a separate facility under the NZP. This would also wipe the perception of a zoo in the eyes of public as a life captivity prison of animals. In this way NZP can be a source of species to balance the ecosystem population, wherever required. The newly created facility under the aegis of NZP will have opportunities for conservation breeding of those species that have a declining trend and unstable population in the wild and then repopulating deficient forest ecosystems as per standard protocol of reintroduction. We may, if found necessary, revisit the current law by allowing access to wild animals for collecting sperms and other genetic material for this upgraded facility. This becomes essential in order to maintain the integrity of the gene-pool of wild grown species.
6. Central Repository: Evolutionary trends and impact of changing environment on the morphology and behaviour of terrestrial tropical mammals can be studied in NZP by preserving body parts of animals after natural death in captivity. Specimens of their preserved skeletal parts could develop into a dedicated high end educational facility. They can be used for making casts of the bones in plaster of Paris and be displayed in Natural History museums for educating masses. This would also slowly develop as a baseline collection of data for future reference.

Nawab Wajid Ali Shah Zoological Garden, Uttar Pradesh

1. The zoo is situated at centre of city; hence zoo needs a separate strong disaster management plan and a security audit. Regular mock drills need to be conducted and documented.
2. Zoo needs to conduct the Conservation breeding program on scientific lines as per approved conservation breeding plan with skilled manpower, appropriate location, layout plan, enclosure design, enrichment, the identification of founder stock, demographic and population management, behavioural management, nutrition, health care, record keeping, research, skilled manpower, funds and reintroduction as per protocol in accordance with the prescribed standards.
3. The income of the zoo needs to be increased for financial sustainability. Zoo must mobilise additional resources (financial through CSR) and generate funds for financial sustainability.
4. Zoo Authority should fill the vacant posts as per CZA guidelines.
5. Enrichment should be added with appropriate structure viz. Tiger, Lion, Bear, Birds and Primate Enclosure. Inpatient ward should also be enriched in cubicles by placing wooden logs, etc. Species specific enrichment to be added to all enclosures.
6. Zoo needs to remove dangerous trees and need to preserve the heritage trees.
7. Efforts should be made to pair up single sex animals and improve the overall animal collection plan.
8. Restrict the visitor's viewing area to 20–30% of total enclosure boundary by growing hedges. There should be natural screen of live hedges between two adjacent enclosures and increase distance between moat wall & Stand of Barrier wherever possible. Also, to make effort to cover/ camouflage the cement structures including night shelters by planting suitable & appropriate species including bamboo.
9. Feed to be hung at scattered points for browsing animals – Sambar deer, etc., and trees inside the arena should be given protection by providing tree guards. Gharial and Mugger enclosure should have an area covered with a layer of sand at the point of basking.
10. Rescue and Rehabilitation of wild animals needs more focus. Zoo must have a rescue facility, to accept rescued animals, and house them in appropriately designed enclosure for lifetime care as per rules.
11. The Zoo Authority should have Research plan and MoU with various research institutes to address issues on zoo management.
12. The zoo needs to improve on the database (physical/ digital) for animals in its collection in standard formats as per CZA norms for maintaining studbooks and carry out genetic and demographic analyses for most animals.
13. The Zoo Authority should make more efforts to manage activities adapting to Climate Change.

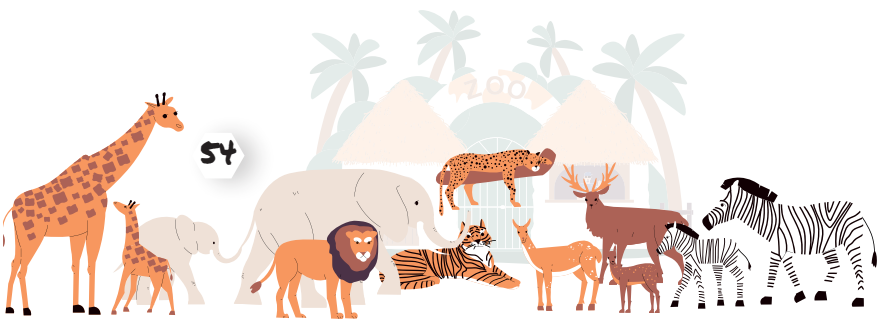


Nehru Zoological Park, Telangana

1. Dry rations to be kept on elevated platforms in steel or plastic containers which have a locking mechanism and marked with enclosure numbers.
2. Volunteers to be trained in different fields. Screening of volunteers from NGOs to be done and mention number of people who help routinely and systematically. So that at the end of the month manhours can be calculated.
3. Quality and design of primate enclosure needs to be improved.
4. Website of the Zoo to be created on priority.
5. Web based live streaming of enclosures and automatic sprinklers to be added.
6. Facilities for persons with disabilities to be incorporated with special regard to visually impaired persons.
7. Animal keeper's diary to be inspected during routine inspections.
8. Recycling of waste water to be initiated.
9. Regarding rescue and rehabilitation, all permissions taken from CWLW to be put up during routine inspections.
10. Zoo must set priorities for research by in house team, collaborate with research bodies and organisations, share data from its database to facilitate research, and publish research work

Sakkarbaug Zoological Park, Gujarat

1. Vision statement should include ex-situ conservation of the important fauna of the Greater Gir landscape. Mission should include improvement of the upkeep, housing, health care of the animals and should include way forward to achieve vision. Strategy needs to be clearly projected.
2. The advisory committee mut be reconstituted and meet regularly.
3. Landscaping plan to be further elaborated with details of the grass and tree species to be grown. Landscaping of individual section like garden, visitor facility, enclosures etc has to be properly spelt out in the plan.
4. Cyclone mitigation plan to be added in the disaster management strategy and mock drills to be regularly done and documented for preparedness. The zoo must issue a written advisory to security, monitor logbook as well as strengthen boundary wall. Solar fencing to be verified. The circular road along the boundary within the Zoo is incomplete and the zoo must plan to have it completed.
5. CSR funds may be explored, by contacting Corporate Organisations proactively.
6. Management should make efforts to fill up the 25% vacancies available especially at lower levels.
7. Development of dedicated website, interactive signage boards, interactive kiosk etc need to be commissioned. The zoo should have outreach program in schools. The staff could move in a van with resource materials to cater to education in schools and colleges. Feedback from visitors should be analysed and appropriate action taken.
8. Out of three buses for visitors, two are diesel buses which may have to be phased out and replaced by battery operated vehicles. Further the quantum of visitor facilities like parking, restaurant, clock room etc has to be determined based on the visitation and using formulae found by experts based on research.
9. Animal acquisition for the pairing of unpaired animals/ birds and mouse deer to be expedited.
10. Garbage disposal yard, segregation yard, vermi-composting has to be made more efficient. Previously mined pits are being used for collection of waste water. Commissioning of the oxidation pond to be made operational. Zoo must consider options for water recycling.
11. Fruit bearing species may be planted for in house food supplementation. Management to focus on rat breeding, poultry and insectariums for specialized feed.
12. Exposure visits, training of the staff need to be further improved



Sanjay Gandhi Biological Park, Bihar

1. Improving Efficiency: About 44% of the posts (168 positions) are reported to be lying vacant. It is imperative to get it filled on priority basis. The zoo management must engage technical positions (curator, biologist, education officer, veterinarian) as per the RZR 2009
2. The infusion of new technology in the field of efficient management of Zoo, Image Management and Disaster Management including Security issues are the need of the hour for which MOU can be thought of with IIT, Patna and with reputed Management Institutes in order to prepare a Way forward vision for five years for further implementation. MOU with Bihar Veterinary College is a progressive sign of management in Animal Husbandry Practices.
3. There should be immediate implementation of Braille signages/Braille interpretation centre for Touch and Feel to understand the animal world. The example can be learnt from Lucknow Zoo or any other Zoos who have worked in this field.
4. Synchronisation of Annual Report with MEE information: The gap in information collection, reporting and action thereby can be bridged if the Annual Report is synchronized with MEE reporting System.

Sri Chamarajendra Zoological Gardens, Karnataka

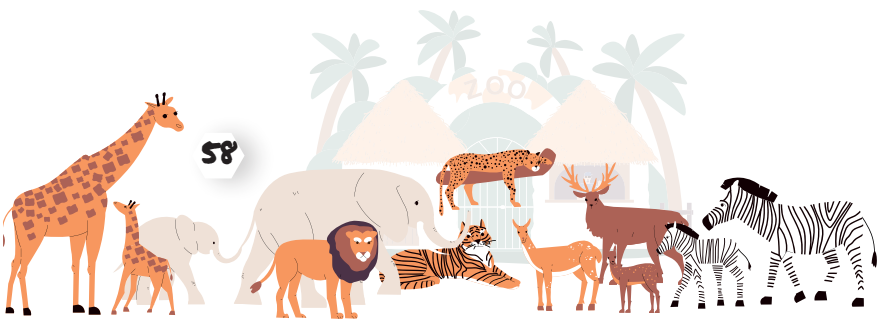
1. Mission, Vision, objectives and strategy mostly identified but need to be systematically formulated and documented, as per NZP policy
2. Zoo must make all efforts to pair single animals
3. The conservation breeding programs for Gaur, Nilgiri Langur, Lion – Tailed Macaque, Dhole, Indian Grey Wolf etc. can be managed with improved scientific rigor and with the development of detailed plans for conservation breeding (including genetic profiling, individual animal marking for identification, community engagement plan, plan for soft release, survey of release sites etc)
4. The zoo management must pursue the development of an interpretation centre.

Sri Venkateshwara Zoological Park, Andhra Pradesh

1. The zoo is advised to have regular Keepers talk fixing certain time for the visitors to make more aware and inculcate empathy towards wild animals.
2. The zoo has to prepare separate sub plan for Disaster management, security plan, education and mechanism for security audit.
3. Being a coordinating zoo for conservation breeding programme plan for grey jungle fowl a separate conservation breeding plan has to be prepared immediately and execute plan to release in wild.
4. Although the veterinary section and education section are maintained through outsourcing basis with adequate education qualification. However, the zoo being a large zoo should have mandatory post of veterinary officers, Education officer, biologist which are yet to be sanctioned by the government. Therefore, the zoo should make all-out effort to get these posts sanctioned and prepare recruitment rule accordingly to recruit suitable candidates.
5. The viewing point for visitors needs to be reduced to 25% by planting live hedge along the peripheral wall of enclosure camouflaging wall too.
6. The zoological Park has Immense scope for research activities which needs to be taken up in collaboration with schools, colleges, university and other institutions.

Thiruvananthapuram Zoo, Kerala

1. Zoo must comply with the essential requirements (ER) (Statutory and Guidelines) along with the conditions imposed while granting Recognition under RZR, 2009.
2. Zoo must draw up relevant plan for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management along with a research plan and disaster management plan with security audit. Regular mock drills must be conducted and well documented.
3. Zoo must have a Conservation breeding program based on scientific lines as per approved conservation breeding plan with skilled manpower, appropriate location, layout plan, enclosure design, enrichment, the identification of founder stock, demographic and population management, behavioural management, nutrition, health care, record keeping, research, skilled manpower, funds and reintroduction as per protocol and in accordance with the prescribed standards.
4. Zoo could mobilise maximum additional resource from internal and external sources (CSR) for sustainable management
5. Zoo must house all animals in appropriate social and demographic structure, allowing optimum breeding and raising self- sustained population without any deviation from that collection plan.
6. Zoo could provide opportunity for stakeholders (volunteers, wildlife enthusiasts etc) to participate routinely and systematically in all management activities under supervision and as per guidelines of the CZA.
7. Zoo must have a rescue facility, with appropriately designed off display enclosure for lifetime care as per rules.
8. Zoo must set priorities for research by in house team, collaborate with research bodies and organisations, share data from its database to facilitate research, and publish research work.
9. Zoo must keep a database (physical/ digital) for animals in its collection in standard formats as per CZA norms for maintaining studbooks and carry out genetic and demographic analyses for most animals.



Annexure 2

Action to be Taken

Group: Medium Zoo

Alipore Zoological Garden, West Bengal

1. The must focus and complete the modification of the old structures and create better and more suitable, species specific housing that is naturalistic and encompassing elements for enrichment for the animals. The viewing area in modified for newly constructed enclosures, Viewing is limited as prescribed in CZA guidelines.
2. A disaster management plan must be developed and mock drills carried out with the well-equipped disaster management team that has been trained to combat the after effect of cyclones, heavy rains or any other man-made or natural disaster.
3. The vacant positions need to be filled and additional post to be created for smooth running of zoo management. The zoo must engage technical staff (curator, biologist, education officer, veterinarian) as per the RZR 2009.
4. The zoo must conduct genetic profiling of endangered species and maintain all animals in health, genetically viable groups after sexing and pairing of the animals. The genetic profiling will be done through ZSI or other appropriate institutions.
5. The zoo must continue the research programmes on different aspects of captive management of animals including veterinary care, health care, breeding etc. and publish the results in peer reviewed journals.
6. The viewing area in modified or newly constructed enclosures is limited as prescribed in CZA guidelines and also have escape zone, hiding place for the animals.
7. The enrichment in night shelters, animal enclosures are being modified and developed according to the seasonal need of the animal and also for the better behavioural response of the captive animals.
8. A second line of feed supply need to revise for emergency purposes.
9. Pest control measures need to be intensified and regularise.

Bhagwan Birsa Biological Park, Jharkhand

1. Only objectives and mission have been defined in the Master Plan. However, the vision, mission and objectives have been identified in the Annual Report 2019-20. They have to be systematically formulated.

2. Zoo must pursue status of masterplan and complete pending compliances imposed while granting recognition.

3. The zoo must draw up plans for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management along with plans for research and disaster management with security audit.
4. The overhanging electrical wires must be removed from the zoo as it may cause fire after the electrical sparks.
5. The zoo must make efforts to increase revenue and Zoo should make consistent and concerted efforts to mobilize additional resources from external sources.
6. Steps may be taken by the government to fill up the vacancy among the staff. Training programs are organised every year for updating knowledge and building capacities of the staff.
7. A Health Advisory committee should be constituted by the Government in the near future.
8. Zoo must house all animals in social and demographic structure, allowing optimum breeding and raising self-sustained population without any deviation of its collection plan. Zoo must ensure population control wherever essential.
9. Animals of some species are still unpaired and appropriate action must be taken immediately to pair the animals.
10. Zoo should seek assistance of CCMB/ LACONES for carrying out genetic and demographic analysis.
11. Zoo management should encourage students/NGOs to participate in management activities after having appropriate MOU with them. Records of voluntary participation should also be properly maintained.
12. Long term Research Plan should be prepared as per the priorities identified. Zoo management should also make sincere efforts to collaborate with research institutions for conducting research.
13. Additional efforts are needed to raise the standards of hygiene especially in the ancillary facilities.
14. Zoo should issue appropriate instructions to the staff for managing disasters and regularly conduct mock drills. Records of mock drills should also be maintained.
15. Zoo should prepare annual training plan and try to provide capacity development opportunities to all staff.

Children's Park, Guindy, Tamil Nadu

1. The zoo needs to meet all the essential requirements (ER) (Statutory and Guidelines) along with the conditions imposed while granting Recognition under RZR, 2009.
2. For better management the zoo needs to prepare education masterplan, research plan, disaster management plan etc.
3. Technical staff (curator/biologist, education officer) need to be hired as per the RZR 2009 to support the scientific management of the zoo.
4. The zoo must consider a fully equipped hospital, with separate quarantine area, post-mortem and carcass disposal facility, diagnostic equipment, sufficient stock of medicine, and diagnostic laboratory services and develop collaborations with State Veterinary Colleges or district veterinary hospitals,
5. The zoo may consider the setup of a Health Advisory Committee having independent experts.
6. The zoo must consider incorporating measures for water recycling, proper disposal of organic and in-organic waste and renewable energy.
7. Sustainable alternatives for guaranteed feed procurement must be put in place.

Dr. Shyamaprasad Mukherjee Zoological Garden, Gujarat

1. Mission and strategy need to be written in detail describing the job on hand step by step.
2. Zoo management may consider the establishment of a Society.
3. The Health Advisory Committee was constituted in 2004. The zoo management may consider revisiting the committee constitution and must hold regular meetings.
4. Zoo management must put in detailed plans for Conservation education, animal enclosure enrichment and captive breeding of animals along with research and disaster management plans.
5. The zoo must fill all technical positions as mandated by the RZR 2009 (curator, biologist, education officer, veterinarian etc) to help in scientific management of all activities in the zoo and carry out research activities within zoo and further publish data in scientific and popular journals.
6. Security mechanism to be strengthened with security audit and regular mock drills.
7. Plan for the construction of breeding enclosures for four horned Antelope and Smooth coated otter must be followed up and implemented. The enclosure enrichment should be upgraded to merge with the surrounding.
8. Zoo management may pursue CSR funding opportunities.
9. Zoo management must upgrade veterinary facilities with modern equipment in the hospital for diagnostics and treatment, fully equipped operation theatre, post mortem room and incineration facility. The zoo management may enter into MOU with veterinary college to support animal health care and diagnostics.
10. Kitchen needs to be upgraded by placing appropriate platforms for hygienic food preparation and facility for storage prior to distribution.
11. Suggested to involve college students as volunteers especially the students of Life Science and interested individuals and engage them in different activities such as education outreach, health care, research projects etc.
12. Vermin control has to be strengthened and records like animal history card and treatment sheet, keeper diary to be properly maintained.

Indroda Nature Park, Gandhinagar, Gujarat

1. The vision of GEER Foundation is clearly stated in the master plan but the mission to achieve needs to be written in detail. Also, the strategy proposed to be adopted to be defined with clarity.
2. The zoo management to constitute a Zoo Advisory Committee similar to the health advisory committee with independent experts, defined TOR and regular meetings.
3. Separately prepare dedicated plan for conservation education, animal enclosure enrichment, captive breeding of animals and landscape management, research and disaster management and include into the masterplan.
4. Resource materials should be standardized and curriculum for students from different classes of schools and colleges be designed. The management can focus on learning materials, support of interpretation centers, theatre and auditorium. Keeper's talk and extension activities where experts from the Zoo can move out

and create awareness and impart education.

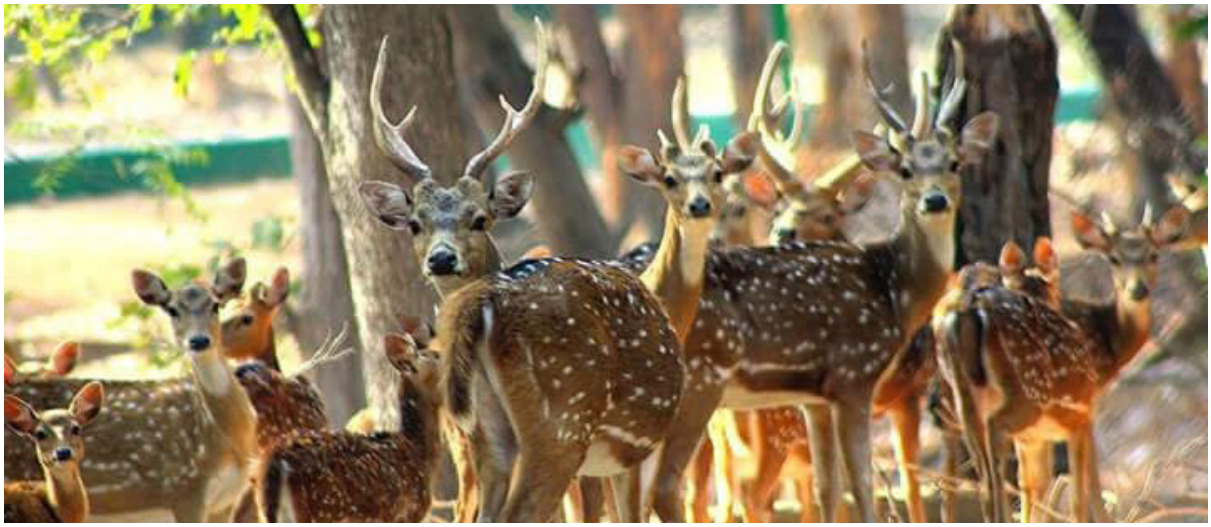
5. The conservation breeding program running at the zoo needs substantial improvement in off exhibit enclosures, skilled manpower, behavioural management, funds and reintroduction strategy etc.
6. Fund from corporate sector may be mobilized through Corporate Social Responsibility (CSR).
7. Zoo needs to develop clock room and mother-infant care room. The quantum of visitor facilities should be worked based on a formula which takes number of visitors into account.
8. Zoo should develop a social media presence.
9. Zoo to upgrade veterinary care facilities in terms of diagnostic ability
10. Zoo to ensure that security should have movement register and the entries should be monitored by supervisory officers.
11. Zoo should increase participation of local school and college students, especially, veterinary students for targeted zoo works. Zoo should invite volunteers round the year. Regular and systematic volunteering must be planned and slowly man hour of volunteering be increased. Zoo management must engage in research in collaboration with local Veterinary institution.
12. Species specific Environment enrichment to be provided across all enclosures and changed as per need.
13. The zoo management should consider options for rainwater harvesting, renewable energy use and water recycling.
14. The zoo management should consider options for use of innovative technologies for enhancing the visitor experience.
15. The zoo should accept animals on rescue only when adequate off display quarantine and holding facilities are available.
16. Zoo management must maintain digital entries of the data and utilise the Zoo-MIS created by CZA.
17. Zoo management must make efforts to find pairs of unpaired animals.
18. Scientific management of conservation breeding program has to be put in place with immediate effect.
19. Zoo should have interactive website so that they can get feedback from visitors. Zoo should also take feedback from visitors attending guided programs.

Jawaharlal Nehru Biological Park, Jharkhand

1. Vision, mission and objectives should be made congruent with each other.
2. Establishment of zoo society will provide much needed functional autonomy to the zoo. It will also enable the zoo to frame its own recruitment rules and create technical posts required as per the RZR, 2009. Only 9 out of 16 conditions imposed by the CZA have been complied with. Completion of all compliance must be ensured.
3. Zoo must draw up relevant plan for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management along with plans for research and disaster management with a security audit. Zoo should periodically conduct security audit and also maintain proper records of the audit.
4. Zoo should recruit Education Officer.
5. Zoo should review the selection of species identified for the conservation breeding in the Master Plan and prepare detailed plan for conservation breeding.
6. Budget allocation for the zoo is highly inadequate. SAIL should substantially increase the budget of the zoo. Zoo should make consistent and concerted efforts to mobilize additional resources from external sources.
7. Zoo must engage a 'Whole time in-charge' Director and sufficient technical staff as per norms prescribed for a medium zoo in the RZR, 2009. Lab Assistant should be

appointed in the zoo.

8. Post-mortem room should have better drainage, light and water facility. There should be cabins to store disinfectants, protective, coverings PM kit, sample collection bottles, etc. and footbath at the exist of PM hall. There should be provision of treating liquid waste before releasing to drainage. Adjacent to PM room, there should be carcasses disposal facility (oil-fired incinerator) of adequate capacity and conforming to CPCB norms. Health Advisory Committee having independent experts should also be constituted in the near future.
9. It is recommended to install CCTV surveillance system along with walkie talkie facilities
10. Zoo should review social and demographic structures of the animals allowing optimum breeding and raising self-sustained population. Zoo should review and improve the social grouping sex ratio of some animals. Zoo should seek assistance of the LACONES for carrying out genetic and demographic analysis.
11. Zoo should review waste disposal system and formulate appropriate strategy for disposal of animal faeces/urine, bio-hazardous/ veterinary waste.
12. Zoo needs to motivate students and zoo enthusiasts to participate in the management activities as volunteers.
13. Zoo should review species specific enrichment of the enclosures and prepare plan for enrichment.
14. Zoo should adopt innovative technologies and should launch its own website following the guidelines for Indian Government websites.
15. Zoo should have proper rescue facilities (off display housing suitable for long term care)
16. Additional efforts are needed to raise the standards of hygiene especially in respect of the personal hygiene of the staff and in the ancillary facilities.
17. Zoo should have adequate number of permanent and well-trained zoo keepers.
18. Additional efforts are needed to effectively respond to all emergencies and disaster situations.
19. Zoo veterinarians should be encouraged to participate in national/ international courses/ workshop/ seminars on a compulsory basis with some monetary support.



Jungle Mahal Zoological Park, West Bengal

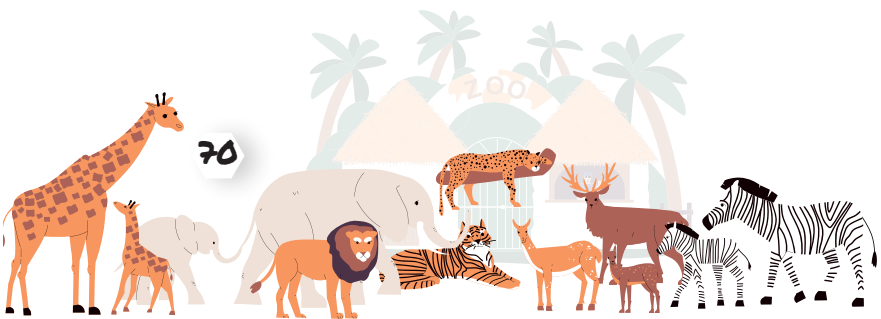
1. At present there is no systematic conservation breeding programme. However, the zoo management may develop detailed CB plan for endangered species (including source of founder stock, marking of animals, facilities available, Human resource available, possible research and timeline for outcomes). there is scope for conservation breeding species like Grey Wolf, Pangolin etc.
2. The zoo may take appropriate measures to function as a rescue and rehabilitation centre for Monkeys/langur, elephant calves and other wildlife. The zoo will need to incorporate the plan in the masterplan and also provide adequate off display facilities for housing the animals should they need long-term care.
3. Nature Interpretation Centre may be used for awareness, conservation education and for displaying varied flora, fauna and capacity enhancement and training programs for forest management, wildlife, Joint Forest Management, man animal conflict mitigation etc. The local culture of Jungle mahal, various audio-visual facilities, flexes, posters, dioramas could be showcased.
4. A curio shop may be established within the Nature Interpretation Centre where mementoes, local handicrafts, T-Shirts, Caps, photo frames representing the zoo, forest and wildlife could be sold to visitors at reasonable price. It may act as income generation of JFMC/EDC as well as act as advertising of the zoo, awareness among people for conservation nature, ecosystem, and wildlife. Further Canteen / coffee shop may be considered based on guidelines of the CZA
5. Zoo may consider development of a website and social media presence
6. Separate enclosures for quarantine for herbivores as well other species-specific enclosures may be constructed.
7. For moisture and soil conservation check dam may be constructed at appropriate locations.

Kamla Nehru Prani Sanghrahalay, Madhya Pradesh

1. Mission, Vision, objectives and strategy must be clearly identified, defined and systematically formulated and documented, as per National ZooPolicy, 1992.
2. Zoo must draw up relevant plan for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management along with plans for research and disaster management with a security audit.
3. Zoo must set priorities for research by in house team, collaborate with research bodies and organisations, share data from its database to facilitate research, and publish research work.
4. Zoo must have animals in good body condition, have species typical social and demographic structure and express natural behavioural traits.
5. Zoo must develop a comprehensive garbage disposal system, a strategy for recycling of wastewater, energy conservation and bio-hazardous/ veterinary waste disposal and has innovative science-based Management
6. Zoo must provide species-specific enrichment in all enclosures and have species specific environmental enrichment so that the animals are active and show insignificant stereotype behaviour.
7. Zoo must maintain a database (physical/ digital) for all animals in its collection (including marking for individual identification) in standard formats as per CZA norms for maintaining studbooks and carry out genetic and demographic analyses for most animals.

Kanan Pendari Zoo, Chhattisgarh

1. Zoo must conduct regular meetings of the committees constituted for efficient management.
2. The Zoo landscape elements; the basic natural features; natural vegetation, water bodies and blank areas must be developed, and buildings architecture must have natural elements merging with the landscape.
3. Zoo must draw up relevant plan for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management along with plans for research and disaster management with a security audit.
4. Zoo Conservation breeding must be planned on scientific lines as per approved conservation breeding plan with skilled manpower, appropriate location, layout plan, enclosure design, enrichment, the identification of founder stock, demographic and population management, behavioural management, nutrition, health care, record keeping, research, skilled manpower, funds and reintroduction as per protocol is in accordance with the prescribed standards.
5. Zoo must develop a comprehensive garbage disposal system, a strategy for recycling of wastewater, energy conservation and bio-hazardous/ veterinary waste disposal and has innovative science-based Management.
6. Zoo must create opportunity and encourage stakeholders (volunteers, students from professional colleges to participate routinely and systematically in all management activities under supervision and as per the guidelines of CZA.
7. Zoo must develop stock of animal feed that is sustainably raised to meet substantial requirement through farm/orchard for fodder, fruits and the rat/mice breeding centre and insectarium provides the specialized feed.
8. Zoo must have a rescue facility and ensure that animals are housed in appropriately designed off display enclosures for lifetime care as per rules.
9. Zoo must provide species-specific enrichment in all enclosures and have species specific environmental enrichment so that the animals are active and show insignificant stereotype behaviour.
10. Zoo must try and implement use of technological innovation in all spheres of management.
11. Zoo must maintain a database (physical/ digital) for all animals in its collection (including marking for individual identification) in standard formats as per CZA norms for maintaining studbooks and carry out genetic and demographic analyses for most animals.



Madras Crocodile Bank Trust/Centre for Herpetology, Tamil Nadu

1. The Health Advisory Committee is to be constituted as per Rule 10, Sub Rule 31 of The Guidelines for the Establishment and Scientific Management of Zoos 2008.
2. The zoo must consider appropriate population management measures to manage the number of surplus crocodiles e.g., release of excess crocodiles in wild.
3. The zoo must consider regular capacity enhancement trainings, seminars for the staff.
4. The veterinary program and facilities at the zoo need improvement
5. The deviations in population structure need to be corrected.
6. The zoo must incorporate mechanisms for Recycling of waste water, Use of re-newable sources of energy. The Zoo should incorporate innovative techniques for recycling of waste water/solid waste management.
7. Animal welfare standards need to be improved.
8. Rat/Mice breeding centre and Insectarium to be developed.
9. Environment enrichment in all enclosures be ensured.
10. Technological innovations in conservation education & technology-based devices for animal welfare to be upgraded.
11. To maintain healthy (physically, behaviourally and genetically) animals social grouping/Sex ratio needs improvement.

Maitri Baagh Zoo, Chhattisgarh

1. Zoo must submit a detailed master plan with Mission, Vision, objectives and strategy clearly identified, defined and systematically formulated and documented, as per NZP policy including the layout, animal collection plan with justifications (as per the checklist).
2. Zoo must comply with the essential requirements (1) FCA clearance if Zoo is established in RF/WLS/NP (2) Establishment of Zoo Society; (3) Approved Master plan and (4) Constitution of an Advisory Committee along with the along with the conditions imposed while granting Recognition under RZR, 2009.
3. Zoo must draw up relevant plan for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management along with plans for research and disaster management.
4. Zoo may try and mobilizes maximum additional resource from internal and external sources (CSR) for sustainable management.

Manipur Zoological Garden, Manipur

1. Vision and Mission Statements must be to the point to inspire the employees towards sense of ownership and accomplishment. Objectives should be specific, measurable and should give deliverables in time-bounded manner.
2. A formal Health Advisory Committee and zoo advisory should be constituted and consideration for formation of a society must be made.
3. Old, decrepit enclosures should be dispensed with and new landscape immersive enclosures should be constructed.
4. Master Plan needs updating (including the animal collection plan) as it is lacking in updated sub-plans related to education, captive breeding, landscape management, conservation breeding, security, animal collection, animal enclosure, etc.
5. The facilities in the zoo are limited in terms of infrastructure, quality human resource and modern gadgets and could be upgraded to improve the quality of programs.
6. The zoo must engage adequate technical staff as per the RZR 2009 with appropriate career progression opportunities and capacity building and training opportunities.
7. The zoo needs improvement in veterinary section on priority basis. With better laboratory and diagnostic facility and better equipment.
8. The zoo needs to improve visitor facilities, transport services, catering, marketing and promotional material as currently there is one ill-equipped hall for training, only one battery-operated vehicle and no promotional material. Interpretation boards at the enclosures have faded and they have content only in English. Content should be bilingual at the least.
9. Animal enrichment provided in the enclosures needs to be redone and planned in a manner that blends with the environment and is specific with consideration of species biology.
10. The zoo is dealing with several cases of wild animal rescue. The zoo must develop a rescue centre (include in masterplan) and must receive animals only if appropriate facilities for off display housing are available.
11. The zoo must keep detailed records (keeper diary, animal history card, treatment cards etc) and manage all data in electronic format (Zoo-MIS is available for use).
12. Field staff must be given training and sensitised towards animal welfare.
13. The zoo needs to make concerted effort to improve and upgrade the veterinary facilities with laboratory and diagnostic facilities and better equipment.
14. The zoo must develop a waste management system that does not put any pressure on environmental parameters.

Nagaland Zoological Park, Nagaland

1. Master Plan should be revised, put together in a detailed manner as early as possible- Mission, Vision and Objectives to be identified systematically and the Strategy to accomplish the specific objectives in a time-bound manner and measurable way through various deliverables to be made. The masterplan should be inclusive of the layout and animal collection plan with appropriate justifications.
2. The sub-plans, e.g., interpretation/education plan, disaster management plan, research plan, etc. should be prepared with the involvement of stakeholders and independent experts. The zoo must also develop a plan for waste management, water recycling, rain water harvesting and renewable energy.
3. The basic natural features; natural vegetation, water bodies and blank areas to be appropriately developed and building architecture must have natural elements merging with the landscape.
4. Information about the species, their habitat, biology and behaviour in wild to be included as interpretative signages which are bilingual (with vernacular language) and zoo education/outreach modules developed on priority.
5. The masterplan prepared in 2014 has not been translated into reality on the ground. Only a realizable plan should be drawn with cognisance of the financial availability through various means (CSR, and others) to make the project a reality.
6. Tiger, Black soft-shell turtle, Rufus-necked hornbill, Brown hornbill, Brown wood owl, Indian peafowl, Pompadour green pigeon, Turtle dove, Rose ringed parakeet,

Great barbet, Slaty parakeet, Red jungle fowl, Alexandrine parakeet, Capped langur, Masked palm civet, Malayan porcupine and Leopard (17 species out of total 43 species present in the zoo at present) are just one specimen. This is highly skewed and unsustainable situation. So, the Animal Collection Plan needs immediate review, and the zoo must make efforts to appropriately pair the single animals.

7. The human resource in the zoo is inadequate and not trained. Veterinary Section (manpower, infrastructure and equipment) and Animal Section (especially related to hygiene in feed section) need special attention. They require trained manpower and infrastructure. The zoo must engage technical staff (Curator, biologist, education officer, veterinarian) as per the RZR 2009.
8. Enclosures to be improved by providing enrichment inside the cages, changing the rusted chain links fences and wire meshes, covering up off-display areas with vegetation, making directional signages, removing litter regularly, etc. Many of the enclosures, mainly for primates and birds, should be demolished and re-built as per the latest designs and species-specific biological and behavioural requirements. The zoo being in a forest area with heavy annual rainfall, the enclosures may easily be made to blend in with the natural habitat.
9. The zoo keepers and their supervisory staff do not make any observation on animal behaviours, except for reporting apparent sickness. The staff and supervisors should be given training and working manuals to record behaviours and other data (keeper diary) and make regular modifications to improve the living conditions for the zoo animals, birds and reptiles.
10. A part of the zoo is submerged under water during monsoon season. Mitigation measures to be explored and a detailed disaster management plan to be put in place.
11. The number of visitors to the zoo is very small, and hence revenue generation is lacking. The zoo should improve their display, give proper interpretation input, increase the number of battery-operated vehicles (there is only one now), introduce more avenues of recreation and learning, strive for animal-adoption programmes, develop a website and social media presence, bring out bilingual brochures, pamphlets and species-related interpretation material, increase the visibility of animals (sambhar, cheetal, black buck, etc are difficult to see in spite of being in good number), develop some recreation facility for children.
12. There are nearly ten oriental pied hornbills housed off-display in a constricted space in the zoo. These birds should either be housed properly, or else should be sent to some other zoo which can house and display them in better way.
13. The zoo must keep detailed records (keeper diary, animal history card, treatment cards etc) and manage all data in electronic format (Zoo-MIS is available for use).

Nahargarh Biological Park , Rajasthan

1. Zoo has not prepared a Master Plan since its inception and shifting to a new site after closing of old Jaipur Zoo.
2. The Zoo society has not been constituted, the revenue is deposited in the treasury (1.4 crore approx..) and Government allocates a budget of Rs 1.2 cr. annually which is not sufficient for a new upcoming ex-situ conservation facility.
3. In the draft Master plan, the sub plan on Education and landscape requires considerable improvement, Enrichment and conservation breeding plan is lacking in core content and has to be drawn afresh in consonance with CZA format and guidelines.
4. Education facilities are lacking, an education officer should be appointed to carry out regular education programme using in house resource material to be

developed.

5. Disaster Management strategy, contingency plan has to be drawn with focus on management action, equipment, vehicle and practice drills to meet emergency. Security review and audit should be an essential part of management.
6. Conservation breeding programme for wolves (participating zoo) should be done on scientific lines based on a plan. The rescue centre is modified as breeding centre with rescued animals kept in the same facility and another part used as Quarantine area. Separate facility needs to be created with skilled manpower (biologist), appropriate enclosure design and enrichment. The identification of founder stock, demographic and population management, behavioural management, nutrition, health care, record keeping, research funds are lacking in conservation breeding.
7. Zoo does not get adequate budget for its development needs as per proposed budget in draft master plan, it is just sufficient for regular maintenance and upkeep. No additional funds (CSR, adoption, sponsorship) are generated
8. Zoo has shortage of staff (81+16=97) and personnel, biologist, lab technician, compounder, education officer which are mandatory as per CZA guidelines have not been appointed, there is need for updation of knowledge and capacity building of staff.
9. Zoo has a moderately equipped hospital, lacks separate quarantine area, post-mortem room and carcass disposal facility(incinerator), in-house diagnostic equipment (X-ray, ultrasound etc) nor has any collaborations with State Veterinary Colleges or district veterinary hospitals.
10. Zoo enforcement is to be strengthened by additional security staff and equipment (communication equipment, vehicle and restrain equipment)
11. Zoo has not encouraged volunteering which should be organized as per CZA guidelines.
12. Zoo does not raise any of the food stock in-house, it must utilize its large vacant areas for raising fodder, tree fodder, fruits and set up insectarium for sustainable feed management
13. Zoo does not have a species enrichment plan and full range of species-specific enrichment has not been provided for welfare of animals.
14. Zoo should adopt innovative techniques/technologies in several spheres of its management
15. The rescue facility requires urgent maintenance.
16. Zoo does not have Research plan nor has set priorities for conduct of research by in-house team and research bodies and organisations, it must collaborate with colleges, institution for using its resources for conducting research.
17. Zoo is maintaining and updating data only in physical form without carrying out any genetic and demographic analysis.

Nandanvan Jungle Safari (Naya Raipur), Chhattisgarh

1. Mission, Vision, objectives and strategy to be clearly identified, defined and systematically formulated and documented, as per NZP policy.
2. Zoo must draw up relevant plan for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management and include the same in the masterplan along with plans for research, and disaster management.
3. Zoo must develop a comprehensive garbage disposal system, a strategy for recycling of wastewater, energy conservation and bio-hazardous/ veterinary waste disposal and have innovative science-based management.
4. Zoo must consider creating opportunity for stakeholders (volunteers, students of professional courses) to participate routinely and systematically in all management activities under supervision and as per guidelines of CZA.
5. Zoo must consider raising stock for animal feed so that supplies is sustainably raised to meet substantial requirement through farm/orchard for fodder, fruits and the rat/mice breeding centre and insectariums provides the specialized feed.
6. Detailed records (Animal History card, treatment cards, keeper diary etc) as per CZA norms must be maintained.

Padmaja Naidu Himalayan Zoological Park, West Bengal

1. To maintain genetically healthy population in long term benefit, proposal may be taken to pool the resources along with all other high-altitude zoos in the country. A platform may be created for Co-operative population management for planned breeding of Himalayan species.
2. Efforts may be taken for better co-ordination at the regional level as well as global level particularly with the zoos dealing with the endangered animals of Himalayan region for purposeful and successful conservation breeding program.
3. A detailed conservation breeding plan for the Himalayan species of priority may be developed (including acquisition of founder stock, animal marking, genetic profiling, data management, human resource, community engagement at release site, release site surveys, soft release plans etc).
4. Quarantine facility needs to be established at Dowhill and Topkeydara.

Rajiv Gandhi Zoological Park and Wildlife Research Centre, Maharashtra

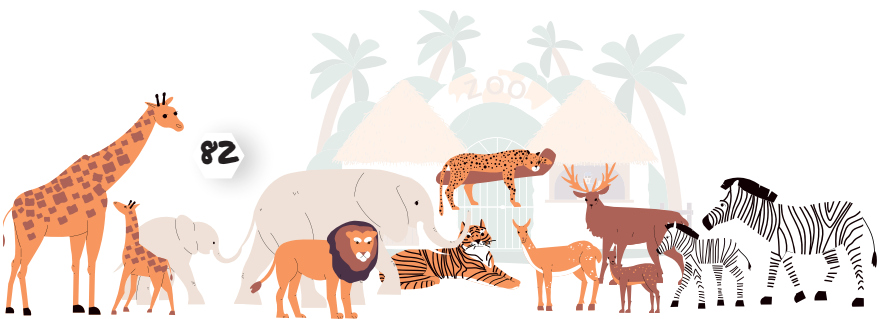
1. Zoo must comply with all the essential requirements (ER) (Statutory and Guidelines) along with the conditions imposed while granting Recognition under RZR, 2009.
2. The basic natural features; natural vegetation, water bodies and blank areas must be appropriately developed and buildings architecture must be aligned with natural elements and merging with the landscape.
3. Plan for Conservation Education; Animal Enclosure Enrichment & Captive Breeding of Animals, research, disaster management must be prepared and included with the masterplan and build collaborations to carryout scientific work
4. The zoo must engage appropriate technical staff (education officer, biologist, curator, veterinarian) as per the RZR 2009. The zoo management must also consider fulfilling the vacant positions as per extant norms.
5. The zoo must focus on developing better visitor amenities and facilities to provide a better zoo visit experience.
6. Zoo must house all animals in social and demographic structure, allowing optimum breeding and raising self- sustained population without any deviation from the collection plan.
7. Zoo must develop a stock for animal feed so that the supply is sustainably raised to meet substantial requirement through farm/orchard for fodder, fruits and the rat/ mice breeding centre and insectarium provide the specialized feed
8. Zoo must set priorities for research by in house team, collaborate with research bodies and organisations, share data from its database to facilitate research and publishes research works.
9. Zoo must keep a database (physical/ digital) for animals in its collection in standard formats as per CZA norms for maintaining studbooks and carry out genetic and demographic analyses for most animals.

Rajkot Zoological Park, Gujarat

1. Vision statement should include ex-situ conservation of the important fauna of the Greater Gir landscape.
2. Mission should include improvement of the upkeep, housing, health care of the animals and should include way forward to achieve vision.
3. Zoo management must consider set up of an Advisory committee of independent experts, further consider the formation of a society.
4. CBC Plan should be prepared as per the CZA format and genetic profiling of the animals included in the CB must be done along with individual marking with PIT tags.
5. Zoo should work on attracting CSR fund raising from the corporate organizations and other sources.
6. Zoo management must put in place training and capacity enhancement for staff of all cadres.
7. Lab and the services of lab technician and store keeper are necessary and must be put in place by the Zoo management.
8. Zoo has to develop Website, publications and promotional materials.
9. Separate quarantine facility is to be developed. Zoo should collaborate with veterinary colleges for medicine and health care of the animals.
10. Zoo management must make immediate effort to pair all single animals in the zoo.
11. More sustainable innovative techniques should be implemented by the zoo for management of organic and in-organic waste.
12. Volunteer program needs better planning and management.
13. Zoo should come up with more enrichment ideas for different species using WII and CZA enrichment guidelines.

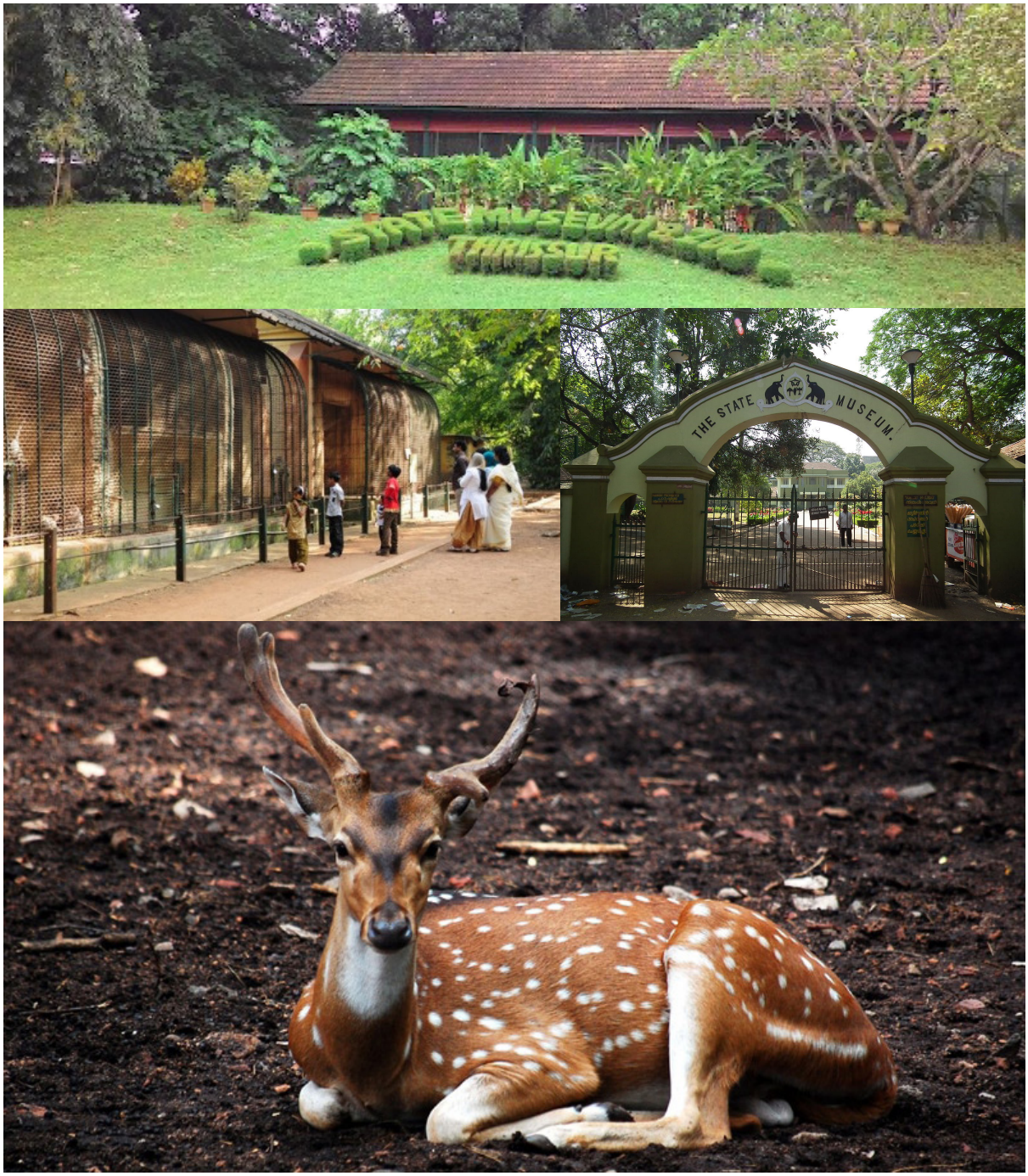
SayajiBaug Zoo, Gujarat

1. Zoo must submit Master Plan with mission, vision, objectives and strategy adopted for Zoo management for scrutiny at the office of the CZA
2. The zoo management must follow up and expedite the establishment of Zoo Society,
3. An Advisory Committee to be constituted comprising of experts working in Government and educational institutions.
4. Plan for Conservation Education; Animal Enclosure Enrichment & Captive Breeding of Animals, research, disaster management must be prepared and included with the masterplan and build collaborations to carryout scientific work
5. The 45% vacancies in permanent sanctioned strength may be filled as per extant norms
6. The recruitment of an additional Lab Technician and other support staff where needed must be completed.
7. The zoo must work out the maximum carrying capacity for each facility/ amenities provided for visitors and appropriate facilities planned based on this and the highest visitation on a single day (based on formula).
8. The Zoo must have quarantine and post mortem facility and incineration for carcass disposal.
9. The zoo must ensure hygienic food preparation, storage and distribution.
10. The zoo must make effort to pair all single sex animals housed in the zoo and maintain social structure and demographics in individual populations.
11. The zoo must consider putting in place best practices for water recycling, disposal of organic and inorganic waster and use of renewable energy
12. The zoo may consider putting in place a volunteer program as per guidelines put forth by the CZA
13. The animal welfare and animal husbandry practices require improvement.
14. Develop orchards and vegetable farms and rat/ mice breeding and insectariums for raising insect.
15. Animal enrichment modules in place at the zoo need improvement to blend in with the natural surroundings.
16. The zoo may consider using innovative technologies for management and visitor engagement.



Sepahijhala Zoological Park, Tripura

1. Objectives of the zoo should be specific, measurable and with deliverables in set- timelines. The Vision Statement should be short, to the point and inspire employees to do their best with a sense of ownership.
2. The zoo may consider development of a society and zoo advisory committee with independent experts from multi-disciplinary backgrounds.
3. Building architecture needs to be improved to make the structures immersing to the extent possible with the green surrounding. Wherever feasible, the enclosures should be made modern-looking and naturalistic.
4. The zoo must revise the masterplan and drawn up relevant plan for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management. Zoo must further include plans for research, disaster management and conduct a security audit.
5. The zoo must engage appropriate technical staff (education officer, biologist, curator, veterinarian) as per the RZR 2009. The zoo management must also consider fulfilling the vacant positions as per extant norms.
6. Single animals should not be kept in the zoo and the zoo management must make efforts to pair the single animals. Similarly, highly skewed sex ratio should not be maintained, and the animal should be housed in compatible and genetically viable groups.
7. Interactive education system, Interpretation boards, quality of content and bilingual signages should be put in place. Outreach programmes should be improved as per the international standards, and use of electronic devices should be added to the talks of keepers and biologist.
8. Training and capacity building to be improved. The keepers and supervisory staff should be given hands-on exposures in better zoos in the country.
9. There is strong need for improving infrastructure, equipment, and quality manpower of veterinary section.
10. Database needs to be prepared. Substitute of ZIMS, perhaps now available with CZA, should be used, wherein information like “national studbook number”, “international studbook number”, etc will provide the linkages with all the zoos.



State Museum & Zoo, Kerala

1. Mission, Vision, objectives and strategy must be clearly identified, defined and systematically formulated and documented, as per NZP policy.
2. Zoo must comply with the essential requirements (ER) (Statutory and Guidelines) along with the conditions imposed while granting Recognition under RZR, 2009.
3. the basic natural features: natural vegetation, water bodies and blank areas must be appropriately developed and buildings architecture must have natural elements

merging with the landscape.

4. Zoo must have a Master Plan (with layout and collection plan with justification) for management of the Zoo and which is periodically updated.

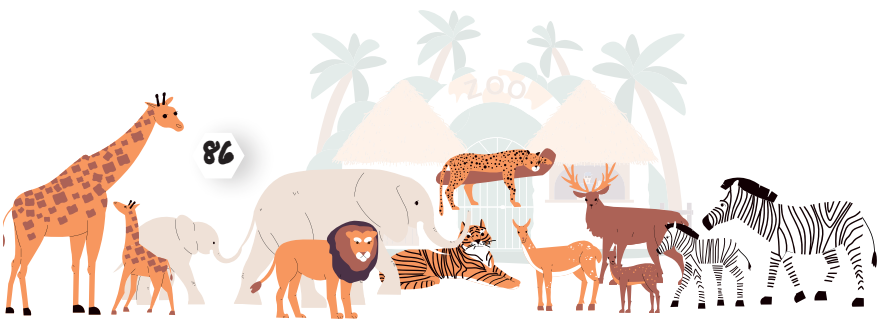
5. Zoo must draw up plans for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management along with detailed plans for research, disaster management along with security audit. Zoo should periodically conduct security audit and also maintain proper records of the audit.

6. Zoo must mobilise maximum additional resource from internal and external (CSR support) sources for sustainable management.

7. Zoo must engage sufficient staff and personnel with adequate qualification, administrative and financial powers and specific assignment of their functions and duties, access to resources, for all the positions, full opportunity for updation of knowledge and capacity building as per RZR, 2009.
8. Zoo must develop a well-equipped hospital, large and small animal operation theatre, separate quarantine area, post-mortem, and carcass disposal facility with sufficient stock of medicine, and in-house diagnostic laboratory services and additionally have collaborations with State Veterinary Colleges or district veterinary hospitals, including a Health Advisory Committee having independent experts.
9. Zoo must house all animals in social and demographic structure, allowing optimum breeding and raising self- sustained population without any deviation from the collection plan.
10. Zoo must develop a strategy for waste management including recycling of waste water, energy conservation and bio-hazardous/ veterinary waste disposal and have an innovative science-based management plan.
11. Zoo must consider creating opportunity for stakeholders (volunteers, students of professional courses) to participate routinely and systematically in all management activities under supervision and as per guidelines of CZA.
12. Zoo must develop stock for animal feed such that it is s sustainably raised to meet substantial requirement through farm/orchard for fodder, fruits and the rat/mice breeding centre and insectarium provides the specialized feed.
13. Zoo must use innovative techniques/ technologies for conservation, education, research, rescue and rehabilitation efforts.
14. Zoo must expedite the research plan and set priorities for research by in house team, collaborate with research bodies and organisations, share data from its database to facilitate research and publish research work.
15. Zoo management must incorporate innovative techniques, best management practices for transforming and enhancing management outcomes.

Tata Steel Zoological Park, Jharkhand

1. Vision, mission and objectives should be reviewed and made congruent with each other.
2. Zoo must comply with the essential requirements (ER) (Statutory and Guidelines) along with the conditions imposed while granting Recognition under RZR, 2009.
3. Zoo must draw up plans for accomplishing the task of Conservation education, animal enclosure enrichment, Captive breeding of animals and landscape management along with detailed plans for research, disaster management along with security audit. Zoo should periodically conduct security audit and also maintain proper records of the audit.
4. Zoo resource allocation is inadequate and the zoo must mobilise additional resources (financial) and generate funds for financial sustainability
5. Zoo requires isolation area, additional better diagnostic facilities and better carcass disposal facilities along with the fully equipped veterinary hospital
6. Zoo should review social and demographic structures of the animals allowing optimum breeding and raising self-sustained population. Zoo should review the population structure of the existing stock and try to manage population following norms enlisted in the RZR, 2009. Zoo may seek assistance of the LACONES for carrying out genetic and demographic analysis.
7. Zoo should also try to address the root causes of high mortality observed during the year 2020-21.
8. Zoo should adopt innovative technologies, have a social media presence and make its website compliant with the guidelines for Indian Government websites.
9. Zoo should review its Research Plan and prepare revised research plan in consultation with the stakeholders. Zoo should also collaborate with research institutions for conducting research.
10. Additional efforts are needed to raise the standards of hygiene especially in respect of the ancillary facilities.
11. Zoo requires adequate permanent zookeepers and supporting staff so that their capacities could be developed in a planned manner.
12. Zoo management may provide more opportunities for training and career progression of zoo veterinarians as wildlife health professional.



Veermata Jijabai Bhosale Udyan & Zoo, Maharashtra

1. Mission, Vision, objectives and strategy must be clearly identified, defined and systematically formulated and documented, as per NZP policy.
2. Zoo must have a security audit system and also conduct mock drill with the team involved in disaster management. The drills must be well documented.
3. Zoo must ensure full time veterinarian, veterinary technician, pharmacist with adequate support staff and individual animal keeper for each species.
4. Zoo must have a comprehensive garbage disposal system, strategy for recycling of wastewater, energy conservation and bio-hazardous/ veterinary waste disposal and have an innovative science-based management plan.
5. Zoo must expedite the research plan and set priorities for research by in house team, collaborate with research bodies and organisations, share data from its database to facilitate research and publish research work.
6. Zoo must keep a database (physical/ digital) for animals in its collection in standard formats as per CZA norms for maintaining studbooks and carry out genetic and demographic analyses for most animals.

MEE-ZOO

Management Effectiveness Evaluation of Zoos in India 2022

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