

Guidelines for Establishment & Scientific Management of Zoos in India



CENTRAL ZOO AUTHORITY
(Ministry of Environment & Forests, Government of India)

2008

Guidelines for grant of approval by the Central Zoo Authority for establishment of new zoo under section 38H (1A) of the Wild Life (Protection) Act, 1972

The Justification for continuance of existing zoos and establishment of new zoos lies in their capacity to develop self-sustaining and genetically and behaviourally viable populations of animals pertaining to endangered species in the wild, for use as gene pool to be used for long-term conservation of these species and to muster support of the zoo visitors in the national efforts for conservation of wildlife. It is well established that the potential of the zoos to discharge the expected role as mentioned above is directly linked to the presence of dedicated scientific staff that has the requisite skills in various aspects of planning and management and the availability of resources necessary for maintaining the highest standards of animal housing, display, upkeep and healthcare of the animals housed there in. With a view to provide the desired direction and thrust to zoos of the country, the Central Government has through amendment of the Wild Life (Protection) Act, 1972 and notification of Recognition of Zoo Rules prescribed minimum standards and norms for housing, upkeep and healthcare of animals housed in the zoos and set up a Central Zoo Authority to oversee the operation of the zoos in the country and to provide technical and other assistance to the zoos for achieving the prescribed standards and norms for animal housing, upkeep and healthcare. However, the endeavour of the Central Government to bring a qualitative improvement in the management has not yielded the desired results because of the fact that most of the zoo operators still continue to perceive zoos as adhoc animal collections maintained for public recreation. There is little awareness among the general public about the role of zoos as centres for conservation of wildlife. As a result, requisite technical manpower and necessary equipments for carrying out the management of the zoos in a planned and scientific manner are not made available. Many times getting adequate feed for the animals and providing proper upkeep and healthcare also becomes a challenging task on account of serious resource constraints being faced by the zoos. Such unplanned and sub-standard zoos are not only counter productive to the cause of conservation but also paints a very poor image of the zoos of the country.

Surprisingly proposals for establishment of new zoos continue to be developed taking little care to ensure adequate inputs for proper planning, zoo designing, construction and operation of the zoo, often leading to further impoverishment of the existing zoos.

Being concerned with the state of management of zoos in the country Hon'ble Supreme Court of India, vide their order dated 27.11.2000, have directed that the State Governments and Union Territories shall not set up any new zoo without getting approval of Central Zoo Authority and order of the Hon'ble Supreme Court. A provision has also been made by the Central Government in the Wild Life (Protection) Act, 1972 to the effect that no new zoo shall be established without prior approval of the Central Zoo Authority.

The Central Government hereby makes following guidelines for grant of approval by the Central Zoo Authority for establishment of new zoos:-

1. Central Zoo Authority shall not entertain any proposal for establishment of a new zoo unless it is accompanied by a "Detailed Project Report" giving detailed appraisal of the proposed zoo site, 'mission-vision-theme' of the zoo and detailed strategy for housing, upkeep and healthcare of the animals and their display for developing amongst visitors an empathy for wild animals and motivation for supporting the national conservation efforts.
2. Central Zoo Authority shall not grant approval for a new zoo unless it is satisfied that the establishment of the zoo shall be instrumental in:-
 - (i) Providing highest standards of housing, upkeep and healthcare to significant number of animals, presently housed in sub-standard and inappropriately managed zoos.
 - (ii) Carrying out of path breaking research for developing innovative strategy for enhancing the reproductive potential, neonatal care and genetic and behavioural management of endangered species of wildlife.
 - (iii) Setting up of state of art facility on use of innovative methods of display of zoo animals that is congenial to the welfare of the animals and motivates the visitors for conservation.
3. Central Zoo Authority before granting approval for establishment of a new zoo shall satisfy itself:-
 - (i) that zoo site has adequate land of appropriate quality (free of all incumbrances, water logging, sewage and storm water drains) is available for construction of the zoo and for raising tree belts of adequate width to act as buffer against noise pollution and air pollution.
 - (ii) project proponents have requisite availability of water, energy and finances on-sustained basis for construction and operation of the zoo, including payment of salary/ emoluments of technical personnel, to be required as per the provision of Recognition of Zoo Rules.
 - (iii) There is likelihood of part of operation cost of the zoo being met through revenue earned by the zoo.
 - (iv) Requisite numbers of qualified and experienced persons are available for preparing the detailed plan of the zoo and its effective execution.
 - (v) No animals from wild are proposed to be acquired for display purposes.
4. Central Zoo Authority while examining any proposal of the State Government/ Union territories for establishment of a new zoo and

recommending such cases to the Hon'ble Supreme Court shall satisfy itself on following additional points:-

- (i) State Government/ Union Territory has made adequate provisions in its budget to meet the operational costs of all the existing zoos being operated by it, including the salary of zoo personnel as per standards and norms prescribed under "Recognition of Zoo Rules" and all the posts sanctioned in the budget have been duly filled.
- (ii) All the conditions stipulated by the Central Zoo Authority at the time of grant of recognition to the zoos being operated by the State Government/ Union Territories have been fully complied with.
- (iii) All the zoos operated by the State Government/ Union Territories, that have been refused recognition have stopped their operations and the animals housed therein have been rehabilitated appropriately.
- (iv) No resources and professional experts from existing zoos are being re-appropriated for establishment of the new zoo.

No permission to establish a new zoo shall be granted by the Central Zoo Authority unless all the conditions stipulated in para 2,3 & 4 have been fully satisfied.

Guidelines of the Central Zoo Authority for facilitating effective and scientific management of zoos in India

With a view to give proper direction and thrust to the operations of the zoos, the Central Government in exercise of powers vested to it under Section 63 of Wild Life (Protection) Act, 1972 had notified Recognition of Zoo Rules, 1992. These Rules have been further rationalized as Recognition of Zoo Rules, 2009 and made more comprehensive and self explanatory. However, some further technical guidance and procedural details need to be provided to the zoos for facilitating effective and scientific management of zoos in India. To achieve the above stated goals the Central Zoo Authority is issuing following guidelines:-

Rule 10, Sub Rule (2) Providing naturalistic environment in the zoo

Zoo should endeavour to maintain the basic naturalistic features of the zoo site such as water bodies, natural ridges and vegetation there on intact. Planting of bushes, hedges and trees should also be done wherever vacant space is available and maintain the same to serve as habitat for free ranging species of wild animals and birds.

Rule 10, Sub Rule (3) Regulation of the movement of the visitors in a manner that the animals are not unduly disturbed

Zoo should not permit in its premises the activities like meetings, conferences, exhibitions, melas and social functions which are inconsistent with the objectives of the zoo and are likely to raise levels of pollution and obstruct the smooth movement of visitors.

Rule 10, Sub Rule (4) Provision of appropriately designed barrier

The perimeter barrier and the entry gate of each zoo should be so designed, constructed and maintained that stray dogs, domestic livestock and feral animals can not get access into the zoo. Provision for posting adequate number of security guards should also be made to keep a close watch so that unauthorized persons do not cause any breaches in the perimeter barrier to get access to the zoo and cause damage to the zoo property or harm to zoo animals. All breaches in the perimeter barrier, whether accidental or man made should be repaired promptly.

Rule 10, Sub Rule (9) & (10) Administration and Staffing Pattern

Every zoo should have a detailed chart indicating duties and responsibilities of all levels of staff also indicating the chain of command for reporting and promptly dealing with the matters pertaining to maintenance and operation of the zoo and the emergencies that may arise during such operations. In the absence of a particular functionary, alternate arrangement should be available for looking after his/her functions. Specific responsibility should be assigned to the zoo personnel with appropriate seniority to attend

and redress the problems faced by the visitors. All concerned should be suitably notified about the same. Subject to availability of staff, a senior staff member should be designated as ex-officio "Public Relations Officer".

Director/ In-charge of the zoo shall be responsible for smooth functioning of the zoo, proper housing upkeep and health care of the animals, proper visitor management and ensuring their safety. For discharge of these functions, he should assign responsibilities and duties to all the zoo personnel. The directions issued by the zoo Director should be binding on all zoo personnel.

The indicative list of the duties for the posts which are mandatory under the rules, is given below:-

- (i) Curator: Upkeep and maintenance of animal collection and animal housing, including timely cleaning and disinfection of animals' enclosure, timely feeding of animals in the prescribed manner, keeping a close watch on the general health conditions of the animals and taking steps for getting sick animals treated on priority basis including crating, shifting and transportation of animals within the zoos.
- (ii) Veterinarian: Frequent visits to animal enclosures and assessing general health condition of animals, assessment of the adequacy of the feed being supplied to the animals, having a regular check on the quality of feed and water being supplied to the animals and timely screening of animals for parasitic loads. Preparation of disinfection schedules, prophylactic treatment schedules and ensuring the implementation of the same. Taking steps for timely restraining and treatment of sick animals, maintenance of record of the treatment provided to animals in prescribed formats, conducting postmortem of animals that die in the zoo for arriving at logical conclusions regarding the reasons of death and device strategies for keeping the mortality of zoo animals at minimum level. He should also be responsible for supervising the crating, shifting and transportation of zoo animals.
- (iii) Biologist
 - (a) Making observations on the behaviour and biology of animals, assessing the compatibility of animals in groups/herds and maintaining meticulous record of the same, ensuring their upkeep and welfare including provision of special diet for pregnant females, nursing mothers, new borns/ new arrivals, infirm and sick animals.
 - (b) Genetic management of animal groups/herds particularly the endangered species including putting identification marks on the newly acquired and new born animals and facilitating timely exchange of animals with other zoos.
 - (c) Enrichment of animal enclosures.

- (d) Recommending regulation of movement of visitors in such a manner that its impact on animals is minimum.
- (e) Maintenance of animal history cards and studbooks as stipulated in Recognition of Zoo Rules.
- (f) Gathering up to date information on behavioural biology and reproductive aspects of zoo animals and use the same for refinement of protocols for animals' housing, upkeep and conservation breeding programme.

(iv) Education Officer

- (a) Preparation of brochures, booklets, CDs and other interpretative material on behaviour biology and ecology of various species housed in the zoo for their further dissemination.
- (b) Designing and upgrading the signages at various enclosures and developing appropriately designed direction boards and appropriate warning signs for regulating movement of visitors.
- (c) Providing orientation and guidance to the visitors for having educative and rewarding experience at the zoo.
- (d) Making arrangements for conducted visits of organized groups.
- (e) Assisting in redressal of the difficulties and grievances of visitors.
- (f) Training the zoo personnel to deal with the visitors in courteous and polite manner without compromising with zoo ethics.

Rule 10, Sub Rule (11) & (12) Preparing the Master Plan for development of zoos

Master plan of a zoo should be a comprehensive document giving a detailed road map for 20 years with a provision of review every 10 years regarding development, improvement and upgradation of the facilities and infrastructure available at the zoo and building up of the capacity for carrying out all the operations forming part of the zoo management with greater efficiency. The development of the master plan of a zoo involves following steps:-

- (i) Define the mission, vision and the conservation message of the zoo through a detailed process of consultation.
- (ii) Thoroughly inventorise and evaluate the existing infrastructure, facilities, resources and services available at the zoo and analyse the same to identify the areas of strength and weaknesses in order of priority.
- (iii) Draft a development brief and identify the priority needs and development project imperatives to address these needs.
- (iv) Use of the project imperatives for developing an implementable action plan along with estimated costs. Try to match the so developed action plan and the projected costs with the available resources and if necessary keep on repeating the process till optimal relationship among all the components of the master plan i.e. a happy marriage between the needs, opportunities,

constraints, risks and rewards is achieved. The concept finally selected along with summary of other studies listed above should be submitted to the zoo operator and the Central Zoo Authority for their concurrence and approval.

- (v) Once the concept plan is approved by the concerned authorities a comprehensive master plan for the zoo should be developed in the prescribed format annexed at Annexure – I to these guidelines.

Priority areas to be given special attention during preparation of the master plan

1. Achieve the highest standards of housing and upkeep for zoo animals with a view to establish self sustaining populations of genetically and behaviourally viable animals adopting latest skills of behavioural enrichment and genetic management.
2. Planned breeding of endangered species through provision of off the exhibit breeding enclosures of requisite specification in adequate number to accommodate the viable breeding population of endangered species.
3. Availability of requisite expertise for upkeep and healthcare of the animals of concerned species for its long-term survival.
4. Thematic display of animals in nature emersing exhibits equipped with feeding and housing facilities congenial to the species specific behaviour of the animals housed therein.
5. To assess the carrying capacity of the zoo in respect of visitors having due regard to space availability and the welfare of the animals particularly the impact through noise pollution and physical disturbance by visitors and thereby appropriate measures to limit the number of visitors within the carrying capacity.
6. Planning the visitor circulation in the zoo in such a manner that the visitors get unobstructed view of wild animals in a pollution free and natural environment.
7. Development of appropriate signages and interpretation facilities that can help the visitors in understanding the ecological linkages of nature and developing an empathy for wildlife.
8. Efficient waste disposal system and sanitation practices for maintaining hygienic and clean environment in the zoo.
9. Design and maintain appropriate public facilities and civic amenities upto the desired standards.
10. Develop elaborate and effective management plans to deal with unforeseen contingencies and natural disasters and high influx of visitors on particular days.

Tools for preparation and effective implementation of master plan

- (a) Identification of the mission for the zoo

Under the Indian conditions the appropriate mission for the zoo could be:-

- I. Compliment the national efforts in conservation of wildlife through planned coordinated conservation breeding of endangered wild animal species of the region.
- II. Develop amongst visitors an empathy for wild animals and motivate them to support the cause of conservation of wildlife.
- III. Develop amongst the visitors an understanding about the ecological linkages with the life supporting processes of nature and the need for keeping them intact by adopting sustainable life styles and living in harmony with nature.
- IV. Enhancing the role of zoos in conservation of wildlife through collaborative research aiming at attaining management skills for *in-situ* population and carrying out advocacy for protecting the wild animals and their natural habitats.
- V. To act as Rescue Centre by receiving and keeping orphaned, seized, rescued, injured wild animals subject to availability of appropriate housing for the same.

(b) Identification of the vision for the zoo

Public should view the zoos as:-

- I. Scientific institutions engaged in animal welfare and conservation of wildlife
- II. Centres of knowledge on effective techniques for maintaining healthy ambience and pollution free environment.

(c) Conservation Message to be imparted to the zoo visitors

- I. Work for conservation of wildlife and its habitat.
- II. Adopt sustainable life styles and live in harmony with nature.
- III. Contain the consumptive use of natural resources within sustainable limits through reuse, recycling and refusal.

Thematic display of animals

Grouping or sequencing the animal displays for achieving any or more than one of the following objectives leads to thematic display of animals:-

- I. Facilitate the visitors to understand the biology and behaviour of the species displayed.
- II. Facilitate the visitors to understand the geographical habitat range of various species and the linkages between the long-term survival of the species with conservation of their natural habitat.
- III. Highlight the mythological and cultural significance of various species of wild animals.
- IV. Apprise the visitors of the composite and complex nature of different ecosystems.
- V. Provide the visitors an absorbing and rewarding experience at the zoo.

The themes generally adopted are:

1. Traditional Themes:-

- (a) zoo-geographic – Continent wise or region wise display
- (b) Taxanomic - Class, family and genera wise display
- (c) Behavioural - Nocturnal, aquatic, burrowing, arboreal
- (d) Mixture of the above – Based on popularity

2. Recent Concepts ---

Simulation/ replication of *in-situ* sites e. g. Chilka lake, Annamallai hills, Western Ghats, Aravalli Hills, Kanha meadow, Sunderban wetlands, Indian deserts, Gir forests, Shiwalik Foothills, etc.

Bio-geographic grouping - High mountain fauna, riverine fauna, Mangrove fauna etc.
 Eco-system display - Nilgiri fauna, Desert fauna, Wetland fauna, etc.

Replication of *in-situ* site and eco-system display require greater technological expertise and involves high costs but are more aesthetic and absorbing. Zoo-geographic and taxonomic displays are easier to implement but often fail due to non availability of animals to replenish the dead animals stock.

Adoption of a particular theme should be done taking into consideration the available space, species held in collection of the individual zoo/ possibility of procurement from other zoos and the financial resources and technical expertise available with the zoo. Having adopted a particular theme, zoo should strictly follow it. Any deviations from the theme would result in paranoic displays sending wrong conservation message and convert the zoo into a unplanned wild animal display facility.

Adopting themes based on local/ regional animals suited to the local climate have greater chances of success. Highly endangered species should normally not be made part of thematic displays.

Under the present state of management of zoos taxonomic displays with few specialized display on bio-geographic/ ecosystem themes shall be a practical approach.

Visitor circulation plan

Traditionally the zoos have extensive network of roads. As all the roads are inter connected, there is every likelihood of the visitors getting disoriented and moving haphazardly in all directions. It is desirable that the zoo should have only one main approach road to take the visitors to the zoo animal display areas. The main road should be connected to various animal exhibits with loop roads and subloop roads of lesser width and specifications on the basis of hierarchy (importance) assigned to each road. The loop roads and subloop roads should intersect the main road at prominent junction points, where appropriate signage indicating the directions of prominent animal exhibits and visitor facilities should be available.

Due safeguards should be taken so that visitor road does not pass through the area adjoining the animal feeding cells, feeding kraals, animal service areas, service road and off the exhibit areas.

If required, zoo could fix different timings for visitors viewing specific animal facilities.

All civic amenities and visitor facilities should preferably be located by the side of main road only.

Animal collection plan

Every zoo shall take a strategic review of the species of animals and their number to be housed in the zoo for preparation of appropriate animal collection plan, with reference to:-

- (a) Space available to each species/ animal and the space actually required for housing all the animals of all the species held in its stock, as per prescribed norms.
- (b) Past and present performance of the zoo in upkeep, healthcare including the congeniality of the local climate for upkeep of the species.
- (c) Records of births and deaths of the animals of each species and the survival of the young ones.
- (d) Cost of upkeep and healthcare of each species.
- (e) Adopted theme of the zoo and the relevance of the species in the thematic display.
- (f) Species identified for planned conservation breeding by the zoo.
- (g) Species with surplus number of animals which are available with other zoos.

Following should be the guiding principles for finalizing the collection plans for different categories of zoos in Indian conditions

I. Large Zoo (National Collection)

Wild animal species of the area/ locality/ ecosystem the zoo is part of (around 30% of the total species displayed); representative wild animal species of region (North, South, West, Central, East or North-east) the zoo is part of depending upon suitability to the climatic condition (around 30%), representative wild animal species of the nation which are comfortable in the climate of the zoo (around 30%) and not more than 10% exotic wild animal species.

II. Medium Zoo (Regional Collection)

Wild animal species of the area/ locality/ ecosystem the zoo is part of (around 40% of total species displayed); representative wild animal species of the region the zoo is part of (around 40%) and not more than 10% selected species of nation and exotics each.

III. Small Zoo (Local Collection)

Wild animal species of the area/locality/ ecosystem the zoo is part of (around 60%), re representative wild animal species which are comfortable in the climate from the region (20%), nation (10%) and exotics (10%).

IV. Mini Zoo (Local common wild animal collection)

Few identified common wild animal species of the area/locality/ecosystem the zoo is part of, may be 1-2 common exotics wild animal species.

V. Rescue Centre

Identified problem wild animal species and orphaned, infirm captive animals not fit for display of the area/ locality/ ecosystem the Rescue Centre is part of:-

- (i) All rescued sick or injured wild animals should be rehabilitated back in wild or in regular lifetime care facility/zoo/rescue centre within 30 days of treatment/ healing depending upon the condition/ suitability of the individuals.
- (ii) All seized wild animals should also be rehabilitated back in wild or in regular lifetime care facility/ zoo/ rescue centre depending upon the condition/ suitability of the individuals with 30 days of the seizure after getting permission of the court dealing with the case.

- (iii) All rescued/ abandoned young wild animal should only be reared in nurseries attached to the Veterinary facilities/ hospitals of the recognized zoos/ rescue centres.

V. Specialized Zoo

Exclusive (Reptile/ Snake/ rodent/ bird/nocturnal/ aquatic park and aquarium etc.) specialized zoo may decide housing animals of one step above level i. e. small of region, medium of nation, large of international level in its collection plan.

2. On the basis of the result of the review as mentioned above, list out the species and the number of animals of each species that are necessary for planned thematic display and conservation breeding in the zoo.
3. With a view to enhance the conservation role of the zoo, some of the glamorous mega specie may have to be excluded from the list to accommodate the animal of endangered species and designing of outstanding exhibits.

Taking into consideration the outcome of detailed analysis as mentioned above, draw out the final list of the species and the number of animals of each species to be housed in the zoo. Fewer species with viable population are always preferable to a collection of larger number of species with non viable numbers.

Master Layout plan for the zoo

Master layout plan is a detailed landscape map of the existing zoo site in a scale of 1:1000 to 1:5000 depending on the area of the zoo. All the existing facilities and infrastructure and the locations of the proposed developmental activities in animal display area, conservation breeding area, rescue centre area, visitor circulation routes, animal upkeep and healthcare facilities including animals' quarantine facilities and isolation wards, visitor education facilities and civic amenities, service roads, administrative blocks, entry plaza, car parking should be clearly indicated on the map. Allocation of land for each activity should be made available having due regard to the provisions made under "Recognition of Zoo Rules" in particular to the Sub rule 11.

Disaster and crisis management plan

Every zoo should prepare a detailed plan to deal with crisis in management, arising out of natural disasters like cyclone, flood, drought and earth quake or accidental happenings like fire, animal escapes, out break of diseases, etc. The crisis sometimes may also arise out of vandalism by unruly visitors, strike by the staff, stoppage of supply of water, power and animal feed due to circumstances beyond the control of the zoo management.

The plan would comprise of:-

- I. Assessment of the degree of subjectivity of the zoo to each type of crisis and list out the crisis which are encountered at the zoo more frequently.
- II. (a) List out necessary equipments to deal with crisis like diesel generators, portable saws, axes, showels, bill hooks, water tankers, diesel pumping sets, ropes, spot lights, emergency lamps, siren, hooter, loud speaker, tarpaulin, chains, nuts and bolts and acquire and stock the same.
(b) List and keep a stock of consumables like diesel, petrol, LPG, kerosene, lubricants, fuelwood, batteries, saw blades etc.
- III. Prepare a line of command for dealing with the crisis and a support contingency plan in case the line of command does not prove effective for some reason.
- IV. Train all concerned to deal with the situation through periodic mock drills. It should be ensured that all equipments are fully functional and effective at all times.
- V. Network and coordinate with specialized agencies like fire fighting units of the State Government/ Union Territories and upgrade the equipments and rationalize the operations on the basis of their inputs.
- VI. Be on lookout for new potential crisis and develop the strategy to meet the same like bird flu, anthrax, retaliatory killing of wild animals etc.

Management Plan

Every zoo should prepare a management plan listing out the activities to be taken up by the zoo for implementing the master plan over next 5 years indicating realistic costs of executing the identified activities and financial year wise targets both physical and financial including anticipated source of funding.

Detailed strategy for achieving the target should also be explained in explicit and elaborate manners.

Rule 10, Sub Rule (13) Dimensions and size of animal enclosures

The land area to be given to any animal exhibit enclosure should be decided having due regard to the maximum number of animals that can be displayed in the animal enclosures. Sambar, Spotted deer, Swamp deer, Sangai and some other ungulates can live in large social groups. Enclosures for such species can easily be designed for displaying 15-20 animals. However, the maximum number of animals that can be displayed in a single enclosure of Chinkara, Chowsingha and Barking deer and similar species should not exceed 5-7.

The area of the enclosure should have adequate land space for facilitating the animals to have free movement and exercise, adequate area to rest in shade and bask in the sun and have safe refuge from dominant animals and express their natural, social and reproductive behaviour.

The animal exhibit enclosures should not be given geometrical shapes, as the presence of corners is not congenial to smooth and unrestricted movement of animals. Enclosures with greater depth facilitate the animals to keep a safe distance from the visitors and are always preferable.

The dimensions and the area of any enclosure should be decided having due regard to various factors mentioned above and the topography and naturalistic features of site identified for construction of the enclosure. However, indicative sizes for the enclosures, both feeding cells and outdoors of important wild animal species are given in Annexure IIA and IIB respectively to these guidelines. The indicative sizes for outdoors are minimum, zoo operator should always try to provide for larger and bigger outdoor to the extent possible.

The area of the outdoor enclosures for herbivore safari and carnivore safari should not be less than 30 hectares and 20 hectares respectively. Mini zoos being operated as Deer Parks and displaying mega species should not be of less than five hectares.

Display of animals in nature immersing enclosures

- (1) Landscape around every animal exhibit/ enclosure should comprise of plantations of appropriate tree and shrub species of adequate extent and such shape that the enclosure should not be visible to the visitors from any place other than the animal viewing areas.
- (2) All the hard exteriors of the enclosure i.e. the enclosure barrier and the frontage of the feeding cells, feeding kraals should be effectively camouflaged through planting of bamboo, dwarf tree species and shrubs.
- (3) Planting of appropriate trees and shrubs should be done around the animal viewing areas to break up the visitors into small viewing groups.
- (4) Visitors should be made to move through the green landscape around the enclosure for reasonable distances.
- (5) Planting, appropriate trees species should be done in the enclosure to ensure that entire animal enclosure is not visible to the visitors from any of the viewing points. The animal should be seen to the visitors in near natural settings.

Making the animal enclosures safe for animals, animal keepers and the visitors

(a) Enclosure Barrier

Barrier of every enclosure should be of a design, dimension and material that can effectively contain the animals housed within the enclosure and safeguard against any animal escaping from the enclosure. Due care should also be taken to ensure that the shutters and doors fitted in the enclosure, kraal and feeding cell are of such material and design that these can not be broken/ opened by the animals housed in the enclosure. The barriers of all the enclosures, except the animal viewing area could comprise of natural cliffs (if any), wall, glass, power fence or chain-link fence, etc. of prescribed dimensions. However, in animal exhibit enclosures, provision of a moat could be made in the animal viewing area, to facilitate the visitors in having an unobstructed view of the animals without getting close to them. Wet moats shall normally not be used as enclosure barrier for the viewing area except in case of water loving animals. The total land area under moat should not exceed 20% of the land area of the enclosure. The indicative design type and dimensions of enclosure barrier are given in Appendix III to these guidelines.

(b) Other safeguards :

- (i) Due care should be taken to ensure that no power line/ power cable passes over any animal enclosure.
- (ii) Enclosure barrier should be erected/ constructed at a safe distance from such trees that can aid the animals to escape from the enclosure or damage the enclosure barrier.
- (iii) Where walls are used as enclosure barriers, due care should be taken to plaster the same with such proportion of cement mix that the plaster does not wither away leaving gaps that could be used by the animal as holds for escaping out of the enclosure.
- (iv) Live wire overhangs or chainlink should be used to prevent the animals from escaping out of the enclosure.
- (v) Water pipelines and sanitary fittings should be fixed within the enclosure in such a manner that the same can not be used by the animal as aid to escape from the enclosures.
- (vi) Adequately deep foundation to be provided for enclosure barrier housing the burrowing species.
- (vii) Attention should be given to different barrier materials, fixtures, shutters etc. to see that they are safe and can not be broken or cause injuries to animals.

Specialised Animal Displays

1. Walk Through Animal Enclosures

- (i) The area open to access by visitors should be clearly delineated and demarcated in such a manner that animals are not impacted by the presence of visitors and that animals are not in a position to injure the visitors.
- (ii) Visitors should be allowed to enter the walk through animal enclosure in controlled groups under proper supervision. Visitors must be adequately informed about the dos' and don'ts, while in the enclosure.
- (iii) All walk through exhibits should have double entry gates and double exit gates to safeguard against any animal from escaping out of the enclosure.
- (iv) Every visitor should be made to walk through a disinfectant footbath before entering the walk through enclosure.
- (v) The carrying capacity of the visitors in the walk through enclosure should be clearly defined and at no point of time the visitor number should exceed the same.

2. Drive Through Enclosures (Safaries)

- (i) Entry and exit to every drive through enclosure should be through a system of double gates. There should be sufficient space in between the two gates, to allow the gates to be securely locked at the front and the rear of every vehicle that enters the drive through enclosure.
- (ii) The gates for drive through enclosure should be so designed and located that the person operating the gates can see and ensure that no animal is standing near the gate at that time when the gate is being opened for the vehicle getting into the enclosure.
- (iii) Arrangement should be in place to ensure that the two gates provided under the double gate entry and exit system do not open simultaneously. The 2nd gate should open when the first gate has been securely locked.
- (iv) Design of the double gates should be such that the same can be operated conveniently by one person only.
- (v) Visitors should be allowed to enter in the enclosure of large cats and Bears only in closed top vehicle and the windows and glasses of the vehicle should be kept securely locked during the period the vehicle remains in the drive through enclosure.
- (vi) Supervisory staff accompanying the vehicle should be armed with appropriate weapons and communication equipment and should be authorized to use the same effectively, if required to do so, to save the visitor from attack by the animals.
- (vii) Trained personnel shall be suitably positioned over the entire drive through enclosure, on appropriately designed watch towers to keep a watch on the movement of vehicles, the animals and intruders, if any and to provide necessary guidance to gate staff, the vehicle

drivers and the animal keepers in carrying out the jobs assigned to them safely and effectively.

- (viii) A rescue vehicle capable of affecting recovery of the vehicles from the drive through enclosure should always be available at the command of supervisory staff as long as there are any vehicles within the drive through enclosures.
- (ix) The layout of roads in the drive through enclosure should be such that the visitors can be shown all the highlights of the enclosure without disturbing the animals in their withdrawal areas.

3. Composite Animal Enclosure

Composite animal enclosures by and large are quite attractive and are quite in vogue these days. The zoo operators, while designing any composite enclosure shall take due care to ensure that:

- (a) Species housed in composite enclosure are compatible in nature.
- (b) There is no competition between the species for utilization of space, food and natural resources.
- (c) The species do not inter-breed.

4. Elephant Enclosures

The elephants being voracious eaters and producers of extraordinary amount of solid wastes can not be maintained aesthetically in the display enclosures. Presence of 'mahaouts and chara cutters' makes the issue of aesthetic display further complicated. It would therefore be desirable to leave elephants in display enclosure for limited period of 6 to 8 hours. For rest of the time, the elephants should be kept in elephant houses of appropriate designs in off the display areas at isolated places. Elephants can be loosely chained with spikeless chains for their own safety. However, suitable padding should also be provided on their legs to safeguard against injuries being caused on account of chaining.

Rule 10, Sub Rule (14) Environmental Enrichment

Any wild animal living free in nature carries out wide range of activities viz foraging, exploration, territorial patrolling, marking territorial boundaries, avoiding predators, wallowing, climbing, burrowing and seeking mates etc. Its social behaviour includes parenting, courtship and other interactive activities viz. chasing each other and indulging in mock fights. All these activities involve constant alertness of visual, olfactory and adulatory stimuli. Even during the inactivity period in wild, the animals are involved in setting up and construction of secure refuges such as nests, burrows, dens, searching tree holes etc.

Under the zoo environment, the environmental complexity is missing and the animal has to make little effort for getting its food and security. The

availability of space for movement and other physical activities like digging, burrowing or nesting, is also limited and the animals can no longer express their natural behaviour. Lack of stimuli to take up any physical activity (absence of hunger and insecurity) and continued stress due to non-fulfilment of natural behaviour leads to development of aberrant/ stereotypic behaviour in the animals, which make them look pathetic.

There is no denying the fact that it is neither feasible nor practical to simulate the conditions of wild in the zoo, still the zoo operators can provide the zoo animals ample opportunities to express their natural behaviour through imaginative enclosure designing and planned enrichment. The technical help of behavioural biologists may be obtained in developing the appropriate enrichment plan for the wild animals.

Important components of Environmental Enrichment of animal enclosures are briefly summarized below :

Behavioural Enrichment :

- (i) Keep animals in compatible social groups. Provide adequate three dimensional space for exercising the normal movement behaviour patterns i.e. walking, flying and climbing.
- (ii) Provide suitable substrate to facilitate the animals to satisfy their digging, burrowing and exploratory instincts.
- (iii) Provide suitable trees, shrubs and bushes in the enclosures to provide the animals opportunities for climbing, swinging, feeding, clawing, playing, rubbing the antlers, etc. Trees take substantial time in growing to required sizes, during the interim period, appropriately sized logs/ branches of trees could be used to meet the behavioural needs of the animals. There should be provision of alternative enclosures for the ungulates living in larger social groups, bears and primates so that the animals could be shifted from one enclosure to the other to facilitate recovery of vegetation.
- (iv) Burrows/ dens could also be constructed to facilitate the animals to hibernate or to take shelter during extreme weather conditions.
- (v) Plant grass and reeds to provide cover area for the animals.
- (vi) Fix mud pots, tree hollows, bamboo baskets to meet nesting and egg laying by birds.

Remarks :

Use of nylon ropes, tyres, and swings should normally be avoided because these do not add to the over all aesthetics and natural environment of the enclosure. These should be used as last resort, when functional requirement of animal can not be met with natural enrichment materials.

Rule 10, Sub Rule (16) Providing effective Stand off Barriers

Minimum height and distance of stand off barriers from the enclosure barriers should be as follows :

S.No.	Barrier type	Height	Distance from the barrier
1.	A long moated viewing barrier	75 cm	75 cm
2.	A long chain-link barrier	75 cm	150 cm

Space between the stand off barriers and enclosure barriers shall be planted with thorny evergreen hedges to safeguard against the visitors crossing the stand off barriers.

Rule 10, Sub Rule (17) Appropriate educational signage

- (i) Signage boards should be made of weather proof, durable, tough and strong material which can last for reasonably long durations and can be reused and repainted.
- (ii) The signboards should be attractive but due care should be taken to ensure that this should not obstruct animal viewing, legible from reasonable distance and should highlight details about the biology, behaviour, distribution and conservation status of the species. Interesting informations like animal diet and longevity should also be highlighted.
- (iii) Signboards should not be loaded with too many informations. Signboards should be understandable to a child/ average literate person.
- (iv) Appropriate graphic illustrations should be provided on sign boards to explain ecological linkages, taxonomical relationships and evolution of species.
- (v) Signage should also provide information on the conservation efforts being made in the country and the role being played by zoos in this regard.
- (vi) Signage should be designed in such a way that they catch the attention of the visitors and the visitors are tempted to read them.
- (vii) Negative signages like the animal being cattle lifter/ man eater should not be displayed as these dilute the message of conservation.
- (viii) Signages should be monitored and evaluated regularly and updated constantly.
- (ix) Signages should be fixed at prominent places at such heights that these can be read conveniently. Avoid fixing signages on trees inside the animal enclosure or along the side of hedge planted between the stand off barrier and the moat wall. Sign

boards fixed near the animal viewing line of visitors look quite attractive.

- (x) Avoid use of gaudy colours for preparation of signage. Use such colours that merge with animal exhibit environment.

Interpretation facilities

Animal - habitat relationship, population dynamics, animal adaptations, animal evolution, ecological role of animals are some of the important areas for interpretation. Interactive devices to get some feel of main strengths of various species, history of animal management in zoos through obsolete animal exhibits- may also interest the visitors.

Nature trails to educate the visitors on local species of fauna and flora in well managed hedge and tree groves and water bodies can help in providing the visitors insight to nature and generate empathy for wildlife. Recorded commentary on different facts about animals in the vehicle used for different safari's can be excellent educational material. Deployment of trained zoo guides for use of visitor groups shall be quite effective

Rule 10, Sub Rule (18) Animal housing, upkeep, hygiene and healthcare

- (1) zoo operators should keep a close watch on the animals housed in every enclosure and any animal that is unduly aggressive and causing grievous injuries to other animals and its continuance at the enclosure is risky to the life of other animals of the enclosure shall be removed from the group/ herd at the earliest and taken to isolation enclosures in off the display area and kept under close observation.
- (2) Efforts to reintroduce the animal in the original herd/ group, alternative herd/ group should be made as soon as the animal has mellowed down, taking adequate safety measures/ precautions.

Explanation Reproductive behaviour of various species should be studied and understood thoroughly so that it is not confused with aggressive behaviour and the animals separated, marring the chances of future procreation of the species.

- (3) zoo operators should ensure that the number of animals housed in every enclosure is within the carrying capacity of the enclosure. Wherever, it is found that the number of the animals in the enclosure has exceeded the carrying capacity, measures to shift the excessive animals to alternative enclosure should be taken with due safeguards to ensure that the animals

already breeding shall not be removed from the original enclosures. For this purpose, it is always preferable to move sub adult males and females from the group/ herd.

Rule 10, Sub Rule (19) Quality of food for animals

- (1) Feed supplied to animals should not only meet the nutritional requirements but should also meet the functional need of animals.
- (2) The feed should be hygienic and of high quality.
- (3) Appropriate food supplements should be added in the animal feeds to avoid nutritional deficiencies or specific needs.
- (4) Larger cat should be provided meat with bones. Occasionally, they should be allowed to feed on full carcasses, if feasible. Pieces of liver should always be added to the meat supplied to the carnivores.
- (5) Ungulates should be provided with tree fodder, wherever feasible in addition to other fodders. Salt licks should also be provided at appropriate places in their enclosures.

Rule 10, Sub Rule (20) Placement and timing of feeding

- (1) Mammalian species should be provided feed in the feeding cells/ feeding kraals on a sterile surface. However, the animals should not be required to stay on a hard surface beyond the feeding time.
- (2) Feed for the animals living in social groups should be sub divided and placed at as many locations as necessary to safeguard against weak and young animals remaining under nourished.
- (3) For satisfying the behavioural instincts, the feed for bears and primates could be hidden in log hollows, burrows, etc.
- (4) Hidden scattered feed dispensation devices could be used where ever necessary.

Timing of Feeding

- (1) Larger animals which are fed only once a day should be provided their full diet towards the closing hours of the zoo for the visitors.
- (2) Intermittent feeding in small quantities could be done to manage and keep the animals active.

Rule 10, Sub Rule (21) Feeding Cells and Kraals

- (i) Every animal enclosure would be provided with feeding cells and feeding kraals at the farthest point from the animal viewing area. No animal would be provided feed in the main enclosure.

- (ii) The design and size of the feeding cells and feeding kraals should be such that these do not stand out and affect the natural environment of the enclosure. To achieve this goal the feeding cell should be constructed in depressed ground, whenever feasible, in other cases feeding cells and kraals should be screened through plantations of appropriate species.
- (iii) All the feeding kraals should have pucca floors and should be covered from the top. Approach to the service door of the feeding kraal should not be through the main enclosure. These should be serviced through a service gallery which is so designed that adequate natural light and aeration is maintained in the gallery.
- (iv) Animals should be in the feeding cells/ kraals/ indoor enclosures only for such duration as it is absolutely necessary for ensuring better health, physical comfort and security of the animal. The number and the area of feeding kraals should be decided on the basis of the number of animals housed in the enclosure.

Rule 10, Sub Rule (23) Watch on the general behaviour and healthcare

Veterinary care/ treatment to any animal should be provided causing minimum possible stress to it. With this objective, every enclosure should have inbuilt facilities for restraining/ examining and treating the animal at the enclosure itself. No animal should be shifted from its enclosure to the treatment ward in the hospital/ isolation ward unless its continuance at the enclosure involves risk of other animals being infected by the disease or the sick animal requires intensive care/ supervision round the clock. The animal so removed from the enclosure should be brought back to the enclosure and introduced in to its social group/ herd as soon as it has recovered from the disease and is fit to fend for itself in the group. Keeping the animals for long durations away from the social group/ herd may lead to problems at the time of reintroduction of the animal in the group/ herd.

Rule 10, Sub Rule (26) Record Keeping

Every zoo should have mechanism for recording of observations regarding social, biological and reproductive behaviour and health status of zoo animals including preventive and curative treatment provided, birth and care of young ones, sicknesses and mortalities as per details given below:-

Keeper's Diary

The Keepers/ In-charges of all sections or beats under the Animal Section of a zoo should maintain keeper's diary in the format as Annexed IV-A, giving animal/ specie-wise details of all the important events and activities pertaining to his section/ beat. The format should be in vernacular language and should be available with the Keeper in the shape of printed ledger

register with serial numbered pages. There should be 2 pages with each serial number so that one copy of the report also remains in ledger register after submission of the second copy to the Incharge, Animal Section daily through his supervising officer before submission the supervisor should also record own comment on the Keeper's Diary.

Daily Report

Curator (Animal)/ Incharge, Animal Section of zoo should compile the important aspects of the reports submitted by the Keepers of the different sections/ beats (Keepers diary) in the format as given in Annexure IV-B and submit the same daily within two hours of opening of the zoo to the Director through the Veterinary Officer. The Incharge, Animal Section; Veterinary Officer and Director of the zoo shall record their observations/ comments in the daily report and take the required action accordingly. Copy of the daily report will go back to the Incharge, Animal Section the same day after the biologist has made necessary entries into the Animal History Cards of the animals/ species reported upon.

Animal History Cards

Animal history cards of each animal which is identifiable shall be maintained by the Biologist (or the Education Officer as the case may be) in the format at Annexure-IVC. The animal history cards shall be maintained as permanent record. For the species where the individuals are not identifiable, the animal history cards should also be maintained herd/ group/ species-wise giving important events as a compendium of information for future use.

Studbook

Studbook of all the animals of endangered species including those born under the planned conservation breeding programme shall be maintained in the format at Annexure-IVD by the biologists of the zoos and National Studbook Keepers of each identified species.

Treatment Card

Individual treatment card for each identifiable animal should be initiated and maintained by the zoo veterinarian in the format at Annexure-IV E, giving date-wise observations made and treatment given to the animal through out its life. The treatment card shall always remain at the place where the animal is housed/ kept. For the individuals which are not identifiable, the treatment cards should also be initiated and maintained species wise. The copies of the same should also be kept at the place where the individual is housed/ kept along with other members of the species.

Remarks- The zoos should endeavor to acquire and become members of the National/International Record Keeping System/ softwares like International Species Information System (ISIS)/ Zoological Information Management System (ZIMS) for scientific management of zoo populations.

Rule 10, Sub Rule (29) Tranquilization of animals in zoos

Tranquilization of zoo animals is a highly specialized procedure that requires thorough knowledge about the chemistry and physiological effects of the tranquilizing drugs on various species of animals, the reversibility of the drug effect and the specific antidotes of the drug. The person taking up the responsibility of tranquilizing any animal should also be fully conversant with the health details, behaviour and the temperament of the animal. In view of the facts stated above, tranquilization of zoo animals would not be resorted to where the traditional methods of restraining the animal viz. squeeze cage, luring the animal into a feeding cell/ appropriate sized cage are likely to yield the desired results, without undue stress to the animals. .

The circumstances under which urgent tranquilization become absolute necessity are :

- (i) Dangerous animals escaping from the enclosure
- (ii) Capturing the animal which is posing threat to the life of some other animals/ people
- (iii) Carrying out surgical operations on seriously injured wounded animals.
- (iv) Close examination and treatment of sick animals.

The decision for tranquilization of such animals can be taken by the veterinary officer/ animal curator of the zoo. The Director of the zoo shall be kept informed on such decisions. The tranquilization team will be lead by a person having adequate experience in tranquilization of animals and the tranquilization shall be carried out under the direct supervision of a veterinary doctor.

Planned tranquilization involving capture of animals for translocation, collection of blood and semen for diagnostic purposes etc. shall be carried out only after getting written permission of the Director of the zoo and subject to such safeguards and conditions as may be prescribed by him.

The normal safeguards during the tranquilization shall be :

- (1) Not more than one animal will be tranquilized at a time. Second animal should be tranquilized only after the animal tranquilized earlier has fully recovered.
- (2) Tranquilization will be carried out by a team comprising of 3-4 persons. Visitors and the other zoo staff, who are not involved in the operation, should not be permitted to be present at the time of tranquilization.

- (3) Tranquilization of any animal shall be done in a manner that the animal is not unduly stressed by way of chasing and making noise.
- (4) All precautions and safeguards given in the literature supplied with the drugs should be followed.
- (5) The physical parameters like body temperature, heart beat, muscle reflexes, eyelid movement, and respiratory rates should be constantly monitored till the animal has fully recovered. Necessary mitigative measures would be taken as soon as some abnormalities in these parameters are observed.
- (6) It shall be ensured that the animal during the recovery phase is kept in a position that the chances of arrest of heart beat and the saliva/ food particles getting into lungs are totally ruled out.
- (7) The animal shall be kept under close observation for at least 24 hours after its revival.
- (8) It is advisable to tranquilize the animal during the cooler parts of the day.
- (9) In case the body temperature is high, the body should be covered with wet cloth.
- (10) The eyes should be covered to prevent exposure to bright light.
- (11) Tranquilization should not be carried out in an area close to a water body to prevent drowning of animal during tranquilization.
- (12) Before tranquilization operation, the prescribed human antidote should be loaded and kept with another person for immediate administration when such need arises, due to the narcotic drugs contact with human body.

Rule 10, Sub Rule (31) Linkages with eminent institutions/ organizations working in the field of wild animal healthcare

All the recognized zoos in India have been provided with basic animal healthcare facilities as per the category of the zoo and its animal collection. This should suffice for day-to-day management of zoo and healthcare of the animals kept there. The zoos have been asked not to acquire sophisticated and costly diagnostic equipments unless there is adequate technical manpower to operate and use the same.

Exact diagnosis of the cause of sickness in a zoo animal and providing it an effective treatment is a very challenging task and no zoo can be self-sufficient both in term of technical expertise and diagnostic investigation facilities required for taking comprehensive healthcare of the large variety of animals housed in the zoos. It is, therefore, incumbent upon every zoo to augment its healthcare facilities by entering into agreement with local/ regional veterinary university/ college/ large veterinary hospital capable of providing appropriate scientific inputs for diagnosis of the diseases of sick animals and advice on the proposed line of treatment of the disease as well as on preventive measures to safe-guard against the recurrence of the disease. The above veterinary institutions will be providing specialized services and diagnostic facilities to the zoos for better healthcare of zoo animals. The Central Zoo Authority has also agreed to provide some financial assistance for establishment of the mechanism at the zoo/ local/ regional level.

The Central Zoo Authority has signed MoU with Indian Veterinary Research Institute, Bareilly to act as National Referral Centre to provide super specialized services and diagnostic facilities for better animal healthcare in Indian zoos. In case the zoos feel that the agreement arrived by them with the organization/ institutions within the region are not able to provide required specialized healthcare, they can approach the National Referral Centre for (a) getting baseline data on the health parameters of various species of animals (b) micro biological, bio-chemical and pathological analysis of the samples taken from live animals and histopathological and forensic examination of tissues and organs of dead animals. The National Referral Centre shall not normally be able to entertain requests for diagnosing and treating the cause of sick animals of zoos/ regional referral centres except on a request by the Central Zoo Authority to tackle the extra-ordinarily situation that cannot be effectively handled by the regional referral centres.

Constitution of Health Advisory Committee: Despite their best efforts, the Regional Referral Centres identified by the zoos can not help the zoos on dealing with sick animals on day to day basis. For dealing with this problem, every zoo should have a Health Advisory Committee comprising of experienced veterinarians with a professor of veterinary college/ eminent wildlife/ zoo veterinarian as its Chairman and the Senior Veterinary Officer of the zoo as its coordinator. The Committee would advise the zoo on all matters related with sanitation, hygiene, prophylactics, nutrition and management of sick animals. The Committee may opt any other veterinarian or specialist as and when required.

The Committee should be kept involved with the visits of the team of the Regional Referral Centre to the zoo. It should also be taken into confidence about the implementation of the advice rendered by the Regional Referral Centre/ National Referral Centre on treatment and management of sick animals. Zoo Director and the Curator (animal) should be actively involved in the meetings of the Health Advisory Committee.

Organization of hands on training for zoo veterinarians

The Central Zoo Authority should facilitate the National Referral Centre to have hands on training of the veterinarians posted/ working with the zoos at the place identified by the centre.

These trainings could be held on national or regional level with support from the Central Zoo Authority.

Rule 10, Sub Rule (32) **Post-mortem and disposal off carcasses**

Findings of the Post-mortem conducted as prescribed under Sub Rule 32 shall be recorded in the format at **Annexure-V**. The report should be preserved atleast for 6 years.

Rule 10, Sub Rule (34) **Euthanasia of a zoo animal**

Decision to euthanize any animal shall be taken only on the basis of the recommendations of the committee constituted for the purpose by the Chief Wildlife Warden of the State on the recommendations from the Director of the zoo to the effect that:-

- (1) The animal is terminally ill and is in such state of agony and pain that it is cruel to keep it alive.
- (2) The animal is suffering from incurable diseases of infectious nature and keeping the animal alive poses a serious threat to the health of other animals at the zoo.

The Committee shall comprise of 2 veterinarians (inclusive of zoo veterinarians) and a representative from the local Society of Prevention of Cruelty to Animals.

Remarks :

Euthanising any zoo animal in contravention of these guidelines would tantamount to illegal hunting under Section 9 of Wild Life (Protection) Act, 1972 read with Sub Section (16) a of Section 2 of the Act.

Rule 10, Sub Rule (35) **Exchange of animals**

Central Zoo Authority shall grant approval for exchange of animals of Schedule I and II subject to following norms and safeguards :

- (i) All the exchange proposals for zoo animals shall be decided on the basis of information available in the studbooks about the pedigree of the animal and its likely contribution in maintaining the heterozygosity level of the species in the breeding programme. The

order of priority for allocating the animals under the planned coordinated conservation breeding programme shall be as follows :

- i. Coordinating zoo
 - ii. Participating Indian zoo
 - iii. Participating foreign zoo
 - iv. Other Indian zoos having appropriate upkeep and healthcare facilities and required technical expertise.
- (ii) Exchange proposals for the species which are not candidate for planned breeding programme shall also be approved having due regard to strengthening of the breeding gene pool for the planned breeding programmes.
 - (iii) Gift of animals to zoos outside the country shall also be made having due regard to the interests of conservation breeding and long term conservation of wildlife.
 - (iv) The zoos having single male/ unpaired male should spare the same to provide mates to unpaired females housed at other zoos as directed by the Central Zoo Authority. The recipient zoo shall bear the cost of crating and transportation of the animals.
 - (v) The Central Zoo Authority while approving other exchange proposals shall give preference to such zoos who are complying with the conditions stipulated at the time of grant of recognition and the provision of Recognition of Zoo Rules, and having housing and upkeep facilities and the climate congenial for the long term survival of the animals proposed to be acquired by the zoo.

The detailed guidelines in this regard are as in Annexure – VI A. The format in which the proposals for exchange of animals are to be submitted by the zoos to the Central Zoo Authority is at Annexure VI B.

The detailed guidelines for transport of captive animals from one place to another are at Annexure – VI C.

Rule 10, Sub Rule (38) Conservation Breeding

Conservation breeding of identified endangered species shall be taken up in India and the Central Zoo Authority shall coordinate conservation breeding programmes of identified critically endangered species in Indian Zoos at national level with following objectives:

- (i) Developing physically, genetically and behaviourally viable populations of healthy animals of identified species for the purpose of display in zoos.
- (ii) Developing physically, genetically and behaviourally viable populations of healthy animals to act as insurance and raise stock for rehabilitating them in wild as and when it is appropriate and desirable.

2. The breeding should be planned in such a manner that the animals bred as part of the conservation breeding programme should not have less than desirable heterozygosity (genetic variation) level in the 10th generation.

3. The conservation breeding programme should preferably start with around 25 founders, which are unrelated and have high heterozygosity. The founders should preferably be of wild origin or of known lineage. Where on account of restricted availability it is not possible to have 25 founders, the programme could be started with fewer animals. Additional founders could be added to the programme in subsequent years, as and when available.

4. For retaining maximum possible heterozygosity, it should be ensured that all founder animals should be represented in each generation equally and no interbreeding is permitted among the progeny of same founder. This would require that each animal born as part of the programme is appropriately marked and sent to the identified zoo for breeding with the progeny of the other founders.

It should be ensured throughout the breeding programme that all the founders are equally represented in the progeny. Surplus or spillover stock can be used for display purposes or released into wild on pilot project basis to develop necessary expertise on reintroduction of animals into the wild.

5. Since loss of heterozygosity with each generation is inevitable, it is important that the target effective population is reached in minimum possible generation. This would necessitate that reproductive potential of every animal in the programme is fully utilized and no founder animal remain unproductive.

Remarks: The effective population size is dependent on the number of males and females, available for breeding purposes. The thumb rule for determining the effective population size is:-

$$\text{Effective population size} = 4 (M \times F) / (M + F)$$

M= Male and F= Female

Consultation with National Referral Centre and Laboratory for Conservation of Endangered Species (LaCONES)

For initiating the conservation breeding programme, each founder animal should be thoroughly screened for its physical health, preferably under the supervision of the National Referral Centre. Appropriate disease prevention safe-guards shall be drawn and strictly complied with.

For genetic health analysis and for reproduction potential evaluation, help of LaCONES shall be taken before induction of any founder animal into the breeding programme. The National Referral Centre as well as LaCONES should continuously be kept involved into the breeding programme. In case

of breeding failure detailed reproductive examination could be conducted and if necessary assisted reproduction methods could be used.

Marking of the animals

Every animal which is part of the Conservation Breeding Programme shall be given an identification number and the same would be marked on it in a manner that it remains permanently on the body of the animal. The details guidelines are annexed at Annexure VII.

Record keeping

Individual animal history card for each animal would be maintained giving details of pedigree, date of birth, identification mark, studbook number in the format prescribed by the Central Zoo Authority. Zoos having the individuals which are part of the breeding programme will report every birth and death of the animal to the National Studbook Keeper and the Central Zoo Authority within 24 hours of the same. The National Studbook Keeper shall give national studbook number to each individual under the programme. The National Studbook Keeper (coordinating zoo) of the species would act as the species coordinator and would issue guidance to the respective zoos regarding the destination each animal is to be sent i.e. for purposes of breeding or display. The species coordinator would also decide as to when particular animal is to be taken out of the breeding programme. The Central Zoo Authority would also be consulted regularly while making decisions mentioned above.

The National Studbook Keepers (Species Co-coordinators) of the species identified to be part of Global Species Management Plan (GSMP) of the World Association of Zoos & Aquariums (WAZA branding) shall be touch with the International Studbook Keeper of the species and arrange for International Studbook Numbers of the identified individual animals and exchange of other scientific details. National Studbook Keeper will be the link between the concerned zoo and International Studbook Keeper of the species.

Price Tags

No zoo will ask for any costs/ animals in exchange for sending any animal for the programme to the other zoos in compliance of the direction of the Central Zoo Authority on the basis of National Studbook Keeper's/ Species Coordinator's recommendation.

Rule 10, Sub Rule (39) Population Control Measures

The zoo operator should ensure that the number of each species housed in the zoo remains within the limit stipulated in the collection plans of the zoo and the carrying capacity of the housing facilities available with the zoo.

In the interest of operational efficiency, better management and optimal utilization of resources, number of animals of various species housed in the zoo should not exceed the number indicated below :

Category of zoo	Optimum number of animals to be housed in a zoo			
	Tiger	Leopard	Bear	Ungulates/ Herbivores of each species
Large	10	10	10	20
Medium	6	6	6	12
Small	4	4	4	10

Rule 10, Sub Rule (40) Safeguards against animals escaping from the animal enclosures/ zoo

- (1) The perimeter wall/ fence of the zoo/ enclosure barriers should be inspected regularly for identifying the weak points/ likely breaches/ unnoticed designing defects which could be used by the animals to escape from the enclosure/ zoo and getting the same rectified and repaired on top priority.
- (2) The trees standing close to the barrier/ perimeter wall should be regularly pruned and lopped as may be necessary to prevent escape of animals from the enclosure/ zoo.
- (3) Pieces of logs, poles that can be used by animals as aid to escape should not be allowed to remain lying in the enclosure.
- (4) Round the clock security should be maintained to prevent the intruders entering the zoo and damaging the enclosure barriers, harm the animals in zoo and damage/ steal other valuable property.

Rule 10, Sub Rule (41) Release of zoo animals into the wild

Release of genetically, biologically and behaviourally viable zoo bred animals in an objective and planned manner in accordance with a well conceived guidelines is an important tool for conservation of wildlife. However, unplanned release of zoo bred animals of unknown pedigree and genetic make up and poor health status often lead to disastrous consequences. In this background strict adherence to the guidelines while releasing any zoo bred/ captive bred animals into the wild is crucial.

Objectives of release of zoo bred/ captive bred animals into the wild

1. Augmenting the depleting number of endangered species in any ecosystem.
2. Reintroducing the species in an area which was part of its historical range, from which the species has disappeared or become extinct due to various factors.
3. Introduction of the species in areas outside its recorded range of distribution, in the habitat that have the potential to hold and

- support the species on a sustained basis without becoming a vermin/ pest.
4. Experimental releases for developing expertise in rehabilitating the zoo bred/ captive bred animals in the wild and preparing detailed protocol for planned release of the species for any of above objectives.

Pre requisites for a successful release programme

1. Capacity of wildlife habitat at the release sight to accommodate and support the released animals and their progeny on a sustained basis, without adversely impacting the population of other species inhabiting the area.
2. Capacity of the animals that are being released to adopt itself in the wild and fend itself successfully.
3. Mitigation/ redressal of the factors that have been responsible for the decline in the size of the in-situ population of the species/ extinction of the species from the area.
4. Release of the animals not posing/ having a potential to pose any physical or health hazard to the local human population and their live- stock.
5. Acceptability of the release programme to the local population.
6. Availability of trained and dedicated man power to execute the preparatory phase, carrying out planned and successful release and conducting post release monitoring of the released animals.
7. Commitment of the Government to support the programme and provide finances and other resources on a sustained basis for various phases of the release programme.

Strategy for successful release of zoo bred/ captive bred animals in the wild

A. Preparatory phase

I. Biological

- (i) Assessment of taxonomic status of the animals earmarked for the release and ensuring that they pertain to the same species/ race that is naturally occurring/ occurred in the area.
- (ii) Assessment of the critical needs of the species to be released including habitat preferences, intra specific variations and adaptations to the local ecological conditions, social behaviour and group dynamics, home range shelter and food requirements, foraging and feeding behaviour, predators and diseases etc. Over all to have and analyse a firm knowledge of the natural history of the species to be released.
- (iii) Species if any, that has filled in the void created by the extinction of the species from the area and effect of the release on the status of the population of that species.

- (iv) Determining the optimal number of animals that can be released each year and most appropriate period for the release.
- (v) Evaluation of previous releases of the species and identification of the problems, mitigation of which is crucial, and priority areas which need to be attended for making the release successful.

II. Choice of the release site

- (i) The site of release should have an habitat that has all the biological attribute necessary for sustained survival of the released animals and their progeny and have adequate carrying capacity to accommodate the released animals and their progeny. As a rule no releases of zoo bred/ captive animals should be done in adequately stocked habitat.
- (ii) The area of release should have assured long term protection against all the factors that can inhibit the future propogation and healthy growth of the population of species released.

III. Suitability of the stock for release

- (i) Animals for release in the wild should be drawn out from the planned conservation breeding programme being carried out under the supervision of the Central Zoo Authority.
- (ii) Animals selected for the release should be thoroughly screened for their biological, behavioural and genetic health in accordance with protocol development by the National Referral Centre and LaCONES. No animal that is found lacking in any of the prescribed standards should be selected for release.

Release of the zoo bred/ captive bred animals in the wild

The animals earmarked for the release should be initially shifted to facility specially created near the release site which has all the attributes of the wildlife habitat in which the animals are to be released to give them time and opportunity to acquire necessary information and skills to survive in the wild, through training, through experts if so required. They should be released in the wild when their behaviour becomes comparable with their wild counterpart.

Socio-economic-Legal Requirements

- (i) Socio-Economic studies should be made to assess the impacts, costs and benefits of the proposed release to the local population.
- (ii) Thorough assessment of the attitude of the local people to the proposed release project should be made and their apprehension if any, should be properly redressed. No release of animals in wild should be made in the wild against the wishes of the local people.

- (iii) Public awareness programme about the benefits of proposed release should be made both through print media and electronic media.

General

- (i) The execution of all the phases of the release programme should be carried out under the supervision of multi disciplinary team of experts.
- (ii) Long term and short term indicators for quantifying the success of the release programme should be identified.
- (iii) Detailed programme for all the phases of the release should be developed so that each stage can be meticulously implemented in planned and scientific manner.
- (iv) Necessary vaccinations against local endemic and epidemic diseases should be given to all the livestock that is likely to share the habitat with the released species.
- (v) Transport plan for the animals should be so prepared and executed that no mortalities take place during the transport.
- (vi) Appropriate orientation and training programmes should be organized for all the persons involved in the release programme.

Post release activities

- (i) Continued demographic, ecological and behavioural studies on released animals should be done both through direct (telemetry/ monitoring of movements) and indirect methods (information provided by local people).
- (ii) Status of adaptation of the animal in the wild should be regularly assessed and desired interventions should be made wherever necessary. Released animals should be retrieved and brought back to the captive facilities in case the intervention do not succeed despite all efforts.
- (iii) Habitat protection/ restoration and enrichment should be done wherever necessary.
- (iv) Continued evaluation of the success of the programme with reference to identified parameters and results should be published in scientific journals/ popular literature.

Rule 10, Sub Rule (43) Research Activities in Zoos

1. Every zoo shall make arrangement for recording in writing, the detailed observations about the biological behaviour, population dynamics and veterinary care of the animals exhibited, so that a detailed database could be developed. The database shall be exchanged with other zoos as well as with Central Zoo Authority.
2. Every zoo shall make arrangements for meticulous recording of the physical activity of the animals viz. infighting, inter group responses, feeding, mating and reproductive behaviour. Detailed record of the

health of the young ones including congenital abnormalities and mortalities shall also be kept. The data so collected shall be shared with identified institutions for detailed analysis and evolving the strategies for increasing the longevity, maintaining the genetic and behavioural viability and enhancing the reproductive potential of endangered species housed in zoos.

3. The data regarding the healthcare and nutrition provided to the animals shall also be regularly monitored and collated for assessing the quality of life being provided to the zoo animals. Data regarding the quantity of feed consumed by the animals shall also be compiled. The aforesaid data shall be shared with National Referral Centre as per the direction of the Central Zoo Authority for improving the veterinary protocols and developing new feeding schedules.
4. The zoos shall also endeavour to compile the data regarding the efficacy of the drugs and vaccines administered to the animals and share it with the National Referral Centre and other eminent institutions working in the field to get their inputs regarding more effective drugs and vaccines.
5. The zoo shall continue to endeavour for identifying the efficacious and easily implementable methods for controlling the population of prolifically breeding species such as putting implants and hormone therapy and use of other suitable methods.
6. Each zoo shall endeavour to keep a detailed record of the effectiveness of the animal enclosures in providing the animal's desired quality of life and the satisfaction provided to the visitors in getting unobstructed view of the animals. The observations made by visitors in this regard should also be compiled. The data so collected shall be analysed and made available to the Central zoo Authority for upgrading the designs of the enclosures.
7. Every zoo shall also keep the record of the quantity of water, electricity and other sources of energy being utilized in upkeep and maintenance of the animals of various species. The data shall also be shared with the Central Zoo Authority to enable them to evolve a strategy for optimum utilization of resources.
8. All zoo personnel shall endeavor to publish their scientific observations on different aspects of zoo/ animal management in the relevant local/ national/ international journals and periodicals for dissemination and upgradation of existing knowledge on *ex-situ* conservation techniques.

Small Grant Fellowships - for initiating Research Activities at zoo Level

Due to lack of technical personnel in zoos and there has not been much progress towards basic and applied research in the field of *ex-situ* conservation and scientific management of animals. Though lot of scientific information is available with the zoos, yet this is not being utilized properly due to lack of proper analysis and inference. There are many issues which can be addressed locally at the zoo level, provided proper scientific/technical help are provided to the zoos, so that they can meet the desired objectives of complementing the *in-situ* conservation efforts as enshrined in the National Zoo Policy.

The Central Zoo Authority provides grant for local need based zoo research projects in the field of *ex-situ* conservation and scientific management of animals in Indian zoos. The zoos may appoint fresh post graduates of the field of wildlife science, veterinary science, zoology and botany to work in project mode on the identified areas of research.

The Ministry of Environment & Forests also gives fellowships for carrying out research on wildlife namely Salim Ali fellowship for carrying out studies on birds and Kailash Sankhala Award for carrying out studies on wild animals. The zoos should encourage their staff to take advantage of these schemes, and carryout research on *ex-situ* conservation of wildlife.

Detailed proforma for applying for Small Grant Fellowship is placed at Annexure - VIII

Rule 10, Sub Rule (45) Submission of Inventory/ Records

Every zoo shall maintain an inventory register for all the animals in stock. Separate set of pages should be assigned to different animal species. Any change in number by acquisition, birth, death or disposal should immediately be made in the inventory register. Annual and quarterly inventory reports of the animals in the zoo as prescribed shall be submitted to the Central Zoo Authority in the formats given at Annexure IX.

**CENTRAL ZOO AUTHORITY
(Ministry of Environment & Forests)****Zoo Master Plan**

The Master Plan is a comprehensive document to guide systematic and planned development of an existing and new zoo for a reasonably long period of 10 to 20 years keeping its land, financial, personnel, physical and aesthetic resources and constraints in view, in order to provide holistic nature conservation education with wholesome recreation. This document helps in optimum utilisation of the zoo resources in a planned manner, without being affected by individual **whims**, peer or uninformed public opinion and serves as a document to guide annual budgeting and personnel planning.

The format**Part-I**

Chapters

1. Introduction- (includes history, objectives, physical features like the topography of the area, geology, rock & soil, flora and fauna, climate, rainfall, season, approach, demography of the surrounding area, legal status of the land, sources of pollution, if any etc.)
(for an existing zoo, the introduction section may also include, the present ground situation, layout, description of different facilities, difficulties faced in the management in the past and achievements)
2. Appraisal of the present arrangement and constraints
 - a) Animal section, veterinary section, store and feed supply section, sanitation section, maintenance section, security section, water supply section, disposal of solid waste & liquid waste-sewerage, visitors amenities, lawns and gardens-landscape section and any other section peculiar to the zoo
 - b) Collection plan
 - c) General Zoo administration section
 - d) Research
 - e) Conservation breeding
 - f) Education and awareness
 - g) Any other activity peculiar/ unique to the zoo

Part-II

Chapters

1. Future objective including mission statement/ theme

2. Future action plan

a) Proposed animal collection plan including population size and justification of keeping the endangered species.

b) Description of the layout plan of the zoo - (Annexe- layout map on scale:

Layout map should be drawn on a scale 1:1000 to 1:5000 depending on area of the zoo with contour interval to be between 1mt to 5mt, depending on the topography. Existing features like water bodies, precipices, forest patches, historical ruins, natural drainage, water channel, rock outcrops etc. should be depicted. North/south direction, visitor circulation and amenities, site for disposal of carcass, water and electricity supply lines, solid and liquid waste disposal, approach road to the zoo and paths, parking arrangement, gates and barriers, administrative buildings- [zoo office, ticket counter, veterinary hospital], housing colony, industries in the surrounding areas, rail, roads - sources of pollution (if any)]

For an existing zoo, other than the above features the layout map should also show existing animal enclosures (black colour), enclosures to be modified (green colour) and the enclosures that need to be redone after demolishing the old structure (red colour). Proposed new enclosures may be in blue colour.

c) Proposal to address the inadequacies and shortcoming identified in the appraisal report (as appraised in Part-I, 2 a). New activities if any, intended to be taken up.

d) Depending on the local condition of the zoo, other items may also be added – peculiar problems of the zoo-like off display conservation breeding centre and rescue centre. Items not relevant can be deleted.

3. Personnel planning:-

This will provide the proposed cadre strength to manage different works considering the activities indicated in the plan including phasing of their deployment, outsourcing etc.

4. Disaster management

Plan to address problems faced during the natural calamities (Fire control, flood, cyclone situations, law and order break down, feed supply etc.)

5. Contingency plan

- (1) Animal rescued from wild.
- (2) Escape of animals from enclosures.
- (3) Monkey and dog menace.
- (4) Arrangement of food in case of strike (non supply by contractor)
- (5) Snake bite.
- (6) Visitors getting injured/ visitors falling inside enclosure.
- (7) Fighting among animals
- (8) Epidemics
- (9) Breakdown of power supply

6. Capacity building

Plan to upgrade skills of zoo staff, interaction with other zoos - regional cooperation.

7. E-governance

8. Broad budget analysis for implementing the plan

- a) Construction and development
- b) Day to day maintenance

9. Annexures to the Master Plan

I. Existing zoos requiring modernisation:-

Layout plan depicting the present setup (animal enclosures, administrative building, visitor amenities, roads etc). Older maps, if available to indicate stages of development.

Existing animal collection plan/ inventory

Free living species occurring in the zoo campus
Flora and fauna

Present staffing pattern and position

List of buildings other than animal enclosures

Notifications- creation of zoo society, acquisition of land etc.,
constitution of committees

II. For new zoos- Site map, legal status of the land, proposed collection plan for animals (list of species)

Notification etc.

Proposed staffing pattern

MANAGEMENT PLAN

The management plan shall be a document which will detail out the activities to be taken up in the line indicated in the Master Plan of the zoo for a particular time frame (1year to 5years), prioritising of the works to be taken up in phases and financial year wise and provide realistic estimates of the proposed works indicating the sources of funding. This should also contain revenue to be collected and funding expected to be received from the government and other sources.

Strategy to be adopted for achieving the goals defined in the Master Plan (Part-II).

The management plan should also contain the procedure to be adopted and person responsible for carrying out different items of works with their financial and administrative powers.

In other words this will be a working document that will guide the managers of the zoo for the management plan period and facilitate the budgeting and focussed development. This will help any new incumbent to carryout development without dislocation.

Annexure – II A

**MINIMUM PRESCRIBED SIZE
FOR FEEDING/ RETIRING CUBICLE
FOR IMPORTANT MAMMALIAN SPECIES
OF CAPTIVE ANIMALS**

Name of the Species	Size of the feeding cubicle/ night shelter for each animal (meters)			Name of the species	Size of the feeding cubicle/ night shelter for each animal (meters)		
	Length	Breadth	Height		Length	Breadth	Height
Tiger, Asiatic lion	2.75	1.80	3.00				
Common leopard, Clouded leopard & Snow leopard	2.00	1.80	2.5	Musk deer, Nilgiri tahr, Chinkara, Four horned antelope, Bharal, Goral, Wild sheep and Markhor	2.5	1.5	2.5
Sloth bear, Himalayan black bear, Brown bear and Malayan sun bear	2.5	1.8	2.5				
Monkeys and Langurs	2.0	1.5	2.5				
Small cats, Civets, Binturong, Otters, Retel, Hogbadger, Martens, Red panda, Wolf, Jackal and Wild dog	2.0	1.5	2.5				
Elephant	8.0	6.0	5.5	Slow loris and Slender loris	1.0	1.0	1.5
One-horned Indian Rhinoceros	5.0	3.0	2.5				
Wild buffalo, Yak, Indian gaur and Wild ass	3.0	2.0	2.5				
Brow antlered deer, Hangul & Swamp deer	3.0	2.0	2.5				

Annexure – II B

**MINIMUM PRESCRIBED SIZES
FOR OUTDOOR OPEN ENCLOSURES FOR IMPORTANT MAMMALIAN
SPECIES IN CAPTIVITY**

Animals/ Species	Minimum size of outdoor enclosure (per pair) (Square meters)
Tiger and Lion	1000
Panther, Clouded leopard and Snow leopard	500
One-horned Indian Rhinoceros	2000
Brow antlered deer, Hangul, Swamp deer	1500
Wild buffalo, Indian bison and Wild ass	1500
Bharal, Goral, Wild sheep and Serow	500
Sloth bear, Himalayan black bear, Brown bear and Malayan sun bear	1000
Red panda, Jackal, Wolf and Wild dog	400
Monkeys and Langurs	500

**MINIMUM PRESCRIBED SIZES
FOR OUTDOOR ENCLOSURES FOR IMPORTANT
BIRDS IN CAPTIVITY**

Animals/ Species	Minimum size of Aviary (Square meters)	Minimum height of the aviary (meters)	Minimum size of the water body within the aviary (Square meters)
Birds of prey	300	8	10
Pheasant *	80	3	3
Water birds (mixed species enclosure)	300	8	60 (with a depth of 1.5m)
Flying birds (mixed species enclosure)	300	8	20
Flying birds (single species)	80	6	2

* In case of Peafowl the aviary size should be kept 160 sq. m.

**MINIMUM PRESCRIBED SIZES
FOR OUTDOOR OPEN ENCLOSURES FOR IMPORTANT
REPTILES AND AMPHIBIANS IN CAPTIVITY**

Animals/ Species	Minimum size of the enclosure (Square meters)	Minimum size of the water body within the enclosure (Square meters)
Crocodile/ Gharial	400	150 (with a depth of 2 meters)
Python	80	6
Cobra, Rat snake, Vipers	40	4
Sand boas	40	4
Monitor lizards *	80	6
Chameleons and Small lizards	40	4
Tortoises	40	4
Turtles	80	40 (with a depth of 2 meters)
Amphibians	10	4 (with a depth of 0.5 meter)

* In case of Water monitor lizard the size of water body should be kept at 40 sq. meters with a depth of 1.5 meters.

NOTE

1. The dimensions have been given only in respect of the species, which are commonly displayed in zoos.
2. No dimensions for outdoor enclosure have been prescribed for Chinkara and Chowsingha because of the problem of infighting injuries. The enclosure for these species could be a group of small sized enclosures with fewer animals in each. Care should be taken to ensure that there should be no competing mating males in each small enclosure.
3. The designs of enclosures for endangered species, not covered by this Appendix, should be finalized only after approval of the Central Zoo Authority.

Annexure – III**GUIDELINES ON USE OF INNOVATIVE EXHIBIT DESIGN AND BARRIERS FOR HOLDING AND DISPLAY OF ANIMALS AND BIRDS IN INDIAN ZOOS****1. Animal Types, enclosure & barrier recommendations**

Animal	Front barrier	Rear barrier	Remarks
Tiger, Asiatic Lion	V-shaped dry or wet moats, glass viewing. Depth of moat: 5m Horizontal width at the top: 8 m	Chain-link fences of 5 m high with 1.5 m overhang at 60 ⁰ angle or high rock walls.	1. The hot wire barrier may be provided to prevent animals coming into the moat. 2. In case of want of space for a moat, all sides can be provided with chain-link mesh fence with toughened glass fixed at 2/3 places for unhindered viewing.
Leopard/Jaguar	1. Chain link mesh fence of 4 m high with inclined inward steel plate of one meter width on the top. The steel plate should be placed at an angle of 60 ⁰ . 2. Wherever space is available 5 meters deep moat with overhang of hot wire.		For a unhindered vision, use of toughened glass of proper specifications at one or two points could be used in case of chain-link option.
Jackal, Wolf, Hyena, Wild dog	V-shaped (flat bottomed) dry moats on the visitor side. Depth of moat: 2.6 m Width of moat: 5 m	Chain-link fences of 2.5 m in height.	For a unhindered vision, use of toughened glass of proper specifications at one or two points could be used in case of chain-link option.
Bear/Civets/ Lesser cats	U-shaped / V-shaped dry moats on the visitor side.	U-shaped / V-shaped dry moats or high smooth walls, or chain-link fence of 4m high with inclined inward steel plate of one meter width on the top.	The steel plate should be placed at an angle of 60 ⁰ .

Primates	U-shaped / V-shaped dry moats, shallow wet moats, glass viewing. Moat width for langur: 7 m Moat depth for langur: 5 m Moat width for macaque: 6 m Moat depth for macaque: 4 m or chain-link mesh of 5 m high with inclined steel plate of 1m width.		a. In case of moated enclosures, the inner side of the enclosure should be provided with overhang with 2 strands of hot wire attached below the slanting portion. b. The moated enclosure should have clearance of tree of at least 9 m from the inner side of fence/moat.
Deer and antelopes	Chain-link fences 2.5 m all around the paddock, V-shaped (flat bottomed) dry moats of 2.5 m depth having width of 6m.	V-shaped (flat bottomed) dry moats or chain-link fences	a. The visitors view should be restricted. b. Slope should be <u>grass sodded (turfed)</u> or stone pitched depending on the site condition.
Gaur, Wild Boar, Rhinoceros, Asian Elephant	V-shaped dry moats, or low walls (clay banks), cattle grids (for gaur) or 5 meters away a sunken B.G. Rail Barrier with 1 to 1.5m high or hot wire fence made in depression, created by excavating earth for camouflaging it from viewer.		
Pheasant	Covered type enclosure of wire mesh of 3 meter high, 10-12 m depth, 6-7 m width		a. The double galvanized mesh of 12mm x 12mm x 4g should be placed 0.5m below the earthen surface to prevent rodents. b. The plinth should have 7 cm (over hang) to prevent rodents/snakes approaching the chain-link mesh from the viewer side or either side.
Walk through aviary	i. The area for the walk through aviary should not be less than 2 hectares with at least 100 m wide withdrawal area for the birds. ii. The height of the aviary should be 12 m.		a. Adequate vegetation should be provided b. Provision of board walk shall be ideal for visitors.

2. Other guidelines

- (i) There should be increasing use of other barriers like hot wire (power fence), glass fronted viewing, rails etc.
- (ii) Use of stainless steel instead of mild steel, particularly on posts and chain-link mesh should be encouraged due to its longevity, avoidance of rust and lighter weight.
- (iii) Environmental enrichment like perches, dens, ledges, nesting boxes, feeding logs, wooden logs, wooden platforms, wallows, pools, logs, vegetation, bunchy earth should be provided in the exhibits.
- (iv) Nocturnal animal houses should provide adequate space, with open air kraal and sufficient number of animals to be rotated and arrangement for proper regulation of lighting.
- (v) Reptile houses particularly in the cooler regions, should be covered and glass fronted with assured heating arrangement in winter i.e. back up power supply.
- (vi) In case of zoos with less than 10 hectares area, creation of moated enclosures should be avoided.
- (vii) Different alternative materials in designing barriers at animal enclosures like stainless steel mesh and posts, anodized aluminum frame, piano wire, hot wire (power fence), glass, vegetation, rail, invisible cattle grid type barrier may be used.

Remarks: No particular barrier can be specified for all situations. Different materials can be used either completely or in combination depending on the species, space availability, topography, climate and existing display type of the zoo. There should be scope for innovation by the zoo management.

Annexure IV A

_____ **Zoological Park**

Keeper's Diary

Name of the Zoo Keeper _____

Section/ beat _____

Day & Date: ____/____/____

S. No.	Enclosure	Species/ individual/ Sex	Observation

Signature of the Keeper

Signature of the Animal Supervisor

Annexure IV B

_____ **Zoological Park**

Daily Report

Day & Date ____/____

S. No.	Section/ Beat and enclosure	Species/ individual	Observations	Action taken/ required

In-charge--Animal Section

Biologist

Veterinary Officer

Director

Annexure – IV C

Zoological Parks

ANIMAL HISTORY CARD

Vernacular (local) name & Common Name :	Scientific name of the species :
House name and ID number of the animal :	Sex: M/F:
Distinguishing mark:	Type of marking – Transponder / Ear tag / Ring/ Others:
National Studbook number of the animal	International Studbook number of the animal
Sire : (Name and National Studbook number)	Dam : (Name and National Studbook number)
Date of Birth (dd:mm:yyyy)	When and from where acquired
Physical health check-up details	Genetic health check-up details
Date of death or other mode of disposal (dd:mm:yyyy)	Remarks

Date	Details of the observations	Signature

Date	Details of observations and treatment given	Signature of Veterinary Officer

Zoological Park

Post-Mortem Report

No. _____ Date: _____

Kind of animal	Scientific name	Sex	Personal name	Age	Size	Weight
				Animal ID/or National Studbook number (if any)		

Time, date and place of death

Time and date of post-mortem Examination

Short history of illness, if any.

A. General description:

B. Organ-wise description of lesions _____

1. Head and neck (a) Skull and brain
(b) Cervical vertebrae
2. Thorax (a) Lungs
(b) Heart
(c) Ribs
3. Abdomen (a) Liver
(b) Stomach
(c) Intestines
(d) Kidney
(e) Spleen
4. Pelvic girdle (a) Uterus and Ovaries
(b) Bladder
(c) Genital passage
5. Limbs (a) Fore limbs
(b) Hind limbs
6. Any other special features:
Biological tests done (if any)
i) Blood
ii) Urine
iii) Discharges
iv) Biopsy
7. Opinion (cause of death)
8. Instruction for disposal

Place:

Signature

Name

DATE:

Designation

(Seal)

Annexure – VI A**GUIDELINES FOR EXCHANGE OR TRANSFER OF ANIMALS BETWEEN ZOOS****Preamble:**

Initially the zoos were functioning as centres for exhibition of wild animals for satisfying the curiosity of the visitors. Over a period of time, their role has changed from mere exhibition centres to centres of conservation. The new role has put upon the zoos a responsibility of providing the animals in their stock better housing and upkeep which can ensure that there are no premature deaths and the animals live a quality life of adequate longevity. Such measures are crucial for developing self-sustaining genetically healthy populations of endangered species in zoos and provide viable groups of compatible animals of breeding age. This objective can be achieved only through expeditious transfer/exchange of animals from one zoo to another. Keeping single animals or unpaired animals merely for the sake of increasing the number of species on display is counter productive. The zoo operators and zoo managers have to respond to the need for conservation of various species of wild animals and contribute to it by way of donating and loaning or giving in exchange of some other species, the single/ unpaired and surplus animals of endangered species for the conservation programmes identified by the Central Zoo Authority.

Central Zoo Authority will take every care that all the zoos are benefited from the exchange programme.

To achieve this goal, following guidelines are being issued:

Guidelines:

1. The exchange proposals submitted by zoos will be decided primarily on the basis of the housing and upkeep facilities available at the recipient zoo and viability of the species population group at the donating zoo.
2. Single animals, unpaired animals and animals in non-viable groups will be transferred to zoos with appropriate housing and upkeep facilities. Preference has to be given to the zoos in the normal habitat range of the species concerned.
3. While approving exchange programme the past track record of the zoo with regard to success in breeding and infant healthcare and upkeep shall be given proper weightage.
4. Animals of wild origin shall be treated as precious commodity. Such animals shall not be permitted to stagnate at rescue centres/mini zoos.
5. All animals of endangered species shall be marked or implanted with a microchip and detailed history cards and studbook for such animals shall

- be maintained. When approving the exchange proposal due safeguard shall be taken to prevent breeding of the animal from the same lineage.
6. Random removal of animals from a breeding group/ herd will not be permitted. Preferably only sub-adults shall be removed and allowed for exchange or transfer.
 7. Exchange of animals to zoos outside India, shall be permitted only if it is in over all interest of the conservation of species concerned and also helpful in enriching the population of indigenous species in the country.
 8. Import of exotic animals in non viable numbers shall be avoided. Such imports will be permitted only as part of planned breeding of species identified_by Central Zoo Authority.
 9. Prior to entering into an exchange with a foreign zoo, the antecedents of the foreign zoo and the nature of housing and healthcare facility available in the zoo shall be verified.
 10. The donating zoo must provide all the details of the animal such as date of birth/ estimated age, feed chart, healthcare measures adopted etc. along with the animal while making transaction with the recipient zoo.

Note: The Member Secretary may issue approval of Central Zoo Authority for exchange proposal involving the wild animal species/ individuals not part of the approved Coordinated Conservation Breeding Programme, if satisfying the guidelines. All the exchange proposals of wild animal species/ individuals between Indian zoos forming part of approved Coordinated Conservation Breeding Programme will be placed in the Technical Committee for approval. All the exchange proposals between Indian and foreign zoos will be decided by the Central Zoo Authority as per recommendations made by the Technical Committee. In urgent cases and where the meeting of the Technical Committee or/ and Central Zoo Authority is not likely to be held immediately, the Member Secretary may issue the approval of Central Zoo Authority for such exchange proposals which satisfy the guidelines with the approval of the Chairman, Technical Committee and/or Chairman, Central Zoo Authority respectively as the case may be. However, ex-post-facto approval will be taken from Technical Committee and/or the Central Zoo Authority (as the case may be) for all such proposals in the next meeting.

Annexure- VI B**PROFORMA FOR EXCHANGE OF ANIMALS BETWEEN ZOOS**

Details about species to be given

Details about species to be acquired

<p>A. General Name of the species Number of individuals in stock and sex ratio Number of individuals to be given and sex ratio</p>	<p>A. General Name of the species Number of individuals already in stock and sex ratio Number of individuals to be acquired and sex ratio</p>
<p>B. Animal Details 1. Age/ Date of birth 2. Specify whether wild origin/captive bred and generation(F1,F2) 3. Breeding record (whether sired/ given birth) 4. Studbook number (national/international) 5. Whether marked, then specify (Transponder no./ring/tag etc)</p>	<p>B. Animal Details 1. Age/ Date of birth 2. Specify whether wild origin/captive bred and generation(F1,F2) 3. Breeding record (whether sired/ given birth) 4. Studbook number (national/international) 5. Whether marked, then specify (Transponder no./ring/tag etc)</p>
<p>C. Purpose 1. Breeding 2. Over crowding/surplus 3. Single or unpaired 4. Others</p>	<p>C. Purpose 1. Breeding/introduce new blood 2. Pairing / Provide mate 3. Forming social group/viable population 4. Others</p>
<p>D. Nature of housing 1. Open air/ Closed (specify area in sq.m) 2. Feeding cells/ kraal (specify dimension in m) and number of cells/kraals</p>	<p>D. Nature of housing 1. Open air/ Closed (specify area in sq.m) 2. Feeding cells/ kraal (specify dimension in m) and number of cells/kraals</p>
<p>E. History of the zoo in: 1. Upkeep 2. Breeding 3. Infant care 4. Mortality</p>	<p>E. History of the zoo in: 1. Upkeep 2. Breeding 3. Infant care 4. Mortality</p>

Annexure – VI C**Guidelines for transport of captive wild animals**

1. Animals in good health only should be transported. Sub-adult animals should be preferred for transportation.
2. Pregnant or females which have recently given birth should be avoided for transport.
3. Infants and too young, incapable of feeding themselves should also not be transported unless prior arrangements have been made for taking all due care for the same.
4. The antlered animals in velvet should not be transported.
5. The animal should be separated from the herd, if needed, sufficiently in advance before transport and complete health check up should be done before transport for assessing its health conditions.
6. The related papers like animal history cards, treatment cards, health certificate should accompany animal while transportation.
7. Necessary arrangements for quarantine at the recipient station should be arranged in advance.
8. The dimensions of the transportation containers for mammalian species should be such that the animal is not be able to turn around or to summer sault.
9. The transport container should preferably be of suitable local material. For many animals, the preferred material will be timber but such materials as bamboo, hardboard and metal may often be suitable for the construction of transportation cage. For transport by air, fiber glass transportation cages can also be preferred as these are light in weight.
10. The floor of the container should be made removable with liquid proof trays under the slatted floor. The slatted construction should be so designed and constructed that the spacing between the slates in such that there is no danger of the animals feet becoming trapped.
11. It is important that all transportation containers should have inner surfaces which are completely free of any projecting nails, screws, ends of mesh or any other sharp material, which could cause injury to the animal. There should not be any sharp edges. Moreover, if any wood preservative or paint is used on the container, it should not be toxic or a skin irritant. It should also be padded with rubber pads to save the animals from injury.
12. The transportation container should have adequate air circulation at all times. There should be additional ventilation by means of holes of suitable size in all walls of the container.
13. Suitable lifting handles or grippers bars should be provided and when the containers will be heavily loaded, the hooks for crane slings and facilities for handling by fork-lift should also be fitted.
14. On long journeys, the animals should be provided suitable bedding materials such as straw or hessian pad.

15. Arrangements for feeding and watering as per the requirement of the species and duration of the journey should be provided.
16. The animals which might have been sedated before their transportation should be transported only under the supervision of a qualified veterinarian only and details of sedation should accompany the animal. Partial sedation in some of the species and individuals when recommended may also be resorted to during transportation.
17. The handling of animals during the transportation should be avoided to the possible extent. The animals should be disturbed as little as possible during the transportation.
18. The transportation of animals should be avoided during extreme weather conditions like dry hot summer and very cold winter.
19. The journey should preferably be performed during day time. The time between 11:00 A.M. to 4:00 P.M. may be avoided during hot summers and nights during winter.
20. While transportation from one climatic zone to another, it is important that the animals are not suddenly moved to contrasting climate to which they are not accustomed. If this is not avoidable, the desired controlled environment should be made available, so that they are exposed to change climatic conditions slowly.
21. The transportation cage should be secured fully to avoid any possible movement or sliding during transport. It is very important to ensure that the transportation cages are kept horizontal throughout the journey.
22. The animal should be accompanied by a qualified Veterinarian and required number of keepers having experience and training in handling individual animals.
23. Every care should be taken to avoid unnecessary discomfort, behavioural stress or physical harm to the animals while crating and transporting.
24. While transporting the animals, due screening of the staff involved in transportation of animal should be made and it must be ensured that they do not infected of any such diseases that can infect the animal.
25. The accompanying Veterinarian should carry all necessary drugs, medicines, first aid kit, restraining equipments and drugs, which may be required during emergency. In the unlikely event of animal sustaining injury during transportation or falling sick, there should be arrangement in the cage for handling the animal for treatment.
26. Arrangement for carrying water sprayers, buckets, additional ropes etc. should also be made and tools for temporary repair of the cages may also be carried during transportation.
27. It is preferred to cage only one animal in a single container, except in birds or mother with babies.
28. For longer distances, the possibility of air lifting should be explored. Lighter transport cages like fiber glass should be preferred for air journeys. The transportation cages should not be placed in closed wagon during transportation by rail.

29. The animals avoid feeding while transportation. It is advisable to properly feed the animals along with required supplement before crating and transportation.
30. There are various guidelines by IATA or CITES for transportation of animals by air. These should be kept in mind while transporting animals by air.
31. The senior most personnel accompanying the animal should carry sufficient money and should have authority to spend the same to meet any unforeseen emergency during transportation.
32. Certificate from the concerned zoo consigning the transportation should accompany the animal and it should be mentioned that no taxes etc. should be paid and vehicle should not be detained. This will ensure smooth transportation without any hindrance, particularly in inter state check gates.
33. During transportation, if there is any emergent need for any assistance from any nearby zoo, the concerned zoo should provide all possible assistance. In case of transportation, it will be ideal to keep the way hide zoo informed in advance about such movement.

Annexure - VII**Guidelines for marking of Animals and Birds:**

1. Ringing of Birds:

Birds should be ringed in left leg in females and right leg in males. Chicks should be ringed only after establishing parental care bond between mother and chick.

2. Ear tagging:

Animals should be tagged in left ear in females and right ear in males. In young animals with thin ears the tag should be affixed to the thickest cartilage portion of the ears, such as the lower half, near the base. In large and adult ungulates it may be necessary to attach the tag to a thinner section of the ear. For ungulates of any age, care should be taken not to puncture any large blood vessels. In general, external tags are not recommended for reptiles and amphibians, with the exception of turtles. Tags are also to be avoided for long slender animals such as snakes and lizards.

3. Implantation of Radio Transponders (Microchips):

In mammals, radio transponders should be implanted at the base of the left ear. Implant site must be cleaned with alcohol before radio chipping but do not shave skin. The implanter needle is placed at an approximately 45⁰ angle to the skin and then positioned almost parallel to the skin surface and transponder is injected under the skin. The needle should be carefully withdrawn and fingers pressure applied to the implantation site for approximately 30 seconds. The implantation site then should be scanned by the reader to verify both successful implantation and transponder's unique code. Transponders should also be checked as well before implanting into animals. Occasionally the needle will leave a wound; if it does, it is recommend to seal the wound with an adhesive skin bond.

Information on location of radio transponders (microchips) in the animals should be filled up in the Individual animal history card.

Annexure – VIII

**Central Zoo Authority
(Ministry of Environment & Forests)**

APPLICATION FOR SMALL GRANT FELLOWSHIP

Please read instructions on last page of this document
Form must be filled in English

Internal Project Number (To be filled in by CZA):

1. GENERAL INFORMATION

Date of application:

Name of the Zoo /
organization:.....

Contact person/ project
leader:.....

2. CLASSIFICATION OF PROPOSAL

Improvement of the Zoo Scientific Management Ex-situ Conservation Welfare of the animals Any other, please specify

3. DATE OF INITIATION OF THE PROJECT

4. DURATION OF THE PROJECT:

5. LOCATION OF THE PROJECT.

Region /State :

Closest main city :

6. STAFF INVOLVED IN PROJECT (please include Curriculum Vitae of the individuals):

1. Name (+ title) +
Zoo/Organization.....

Period to be spent on the project from: to:
(day/month/year/) for hours/week

Role / Function in the project:

2. Name (+title) + Zoo/Organization:

Period to be spent on the project from: to:
(day/month/year/) for hours/week

Role / Function in the project:

3. Name (+title) + Zoo/Organization:

Period to be spent on the project from: to:
(day/month/year/) for hours/week

Role / Function in the project:

7. PROJECT PROPOSAL

7a. Background and history of the project (max. 300 words)

7b. Main problem or question (max 200 words)

7c. Aims and objectives of the project (max 200 words)

7d Methodology and/or proposed activities (max 300)

8. COLLABORATION (IF ANY): Please specify with which institutions/organisations will collaboration take place and type of the collaboration & support should also be indicated.

	NAME	LOCATION
NGO's		
Ministries	
Universities	
Research institutes / or any other	

Type of the collaboration and support.....

8a. Support from host zoo: (Please specify what support the host zoo will be providing, it could be in the form of laboratory, equipment, space or personnel).

9. BASIC TIME SCHEDULE

10. OUTPUT

10a. Describe which output can be expected from this project (reports, (scientific) publications, management plans, educational tools, etc. etc.) and how they will be disseminated.

10b. Describe the (practical) relevance of this project for ex-situ conservation and scientific management of animals in general

10c. Describe how results/output will be evaluated (timelines and benchmarks)

11. FEASIBILITY (How well is the execution of the project guaranteed? Possible risks such as logistics, permits, other finances and how are these risks dealt with).

12. FINANCIAL ASPECTS (please include budget overview (in Rs.) in an appendix)

12a. Other financial sources applied for and/or guaranteed

- In case of Forest Dept./Corporation/Trust: please also mention the details

- Indicate if source is applied for or already guaranteed

2. Name Department / Institute: Self

Address:

.....

∴

Amount applied for or guaranteed:

Rs.____

3. Name Department / Institute:

∴

Address:

∴

.....

∴

Amount applied for or guaranteed:

Rs.____

13. DECLARATION

The information submitted in this application is true, to the best of my knowledge. Should any significant developments arise after this application is made, I shall notify the Member Secretary, Central Zoo Authority. .

SIGNATURE

Director/Curator/
Warden/
Officer-In-charge of the Zoo
Municipal Commissioner/
(Supervisor of the Research)
Owner/Zoo Operator

Research Project Leader

Chief Wildlife

Signature:

Date:

Seal

Signature:

Date:

Signature:

Date:

Include with the proposal:

- A curriculum vitae of the applicant and individuals involved in the project
 - Background information about the zoo involved (max. 1 page)
 - Budget overview
-

Brief Instructions:

EXPLANATION TO THE INDIVIDUAL QUESTIONS OF THE
FORM 'SMALL GRANT FELLOWSHIP PROPOSAL'

Question 1: Name of the project leader and address.

Question 2: Please indicate the duration of the entire proposed project.

Question 3: Please write down the /region, state, department in which the project will be or is carried out.

Question 4: Please write down the names of the persons involved in the project. If necessary continue on extra sheet. Background information on the involved organizations can be added in an appendix.

Question 5 Give a brief background, main question and aims and objectives of the project. Please confine yourself to the maximum number of words.

Question 6: Please, mention the collaborating organizations, if any, participating in this project and state the role and responsibilities of the collaborator.

Question 7: Provide a basic time schedule for the activities of the project.

Question 8: Please give significant outputs which can be expected from this project. Describe the (practical) relevance of this project in ex-situ conservation and scientific management of animals in zoos.

Also indicate how the project will be evaluated so it can be decided if the objectives have been met.

Question 9: Please specify how well the execution of the project is guaranteed? Possible risks such as logistics, permits, other finances and how are these risks dealt with.

Question 10: Please give a detailed budget and a breakup of the financial assistance sought from Central Zoo Authority (include an budget overview in an appendix), the financial sources that are already guaranteed, and other institutions/programmes that have been requested for co-financing the proposed project. Send written proof of contributions already guaranteed.

Question 11: This form must be signed by the Head of the institution and the project leader of the project and forwarded through the Chief Wildlife Warden/Municipal Commissioner/Head of the organization.

You may send your completed project proposal by email to cza@nic.in. A hard copy of the original with signatures & seals and any relevant paper copies (i.e. written proof other financial sources) should be sent by registered mail to Member Secretary, Central Zoo Authority, Annex No. VI, Bikaner House, Shahjahan Road, New Delhi – 110 011.

Annexure – IX**Proforma for Quarterly/ Annual Inventory Report**

Part – I A

Inventory Report for the Quarter/ Year :

Endangered Species*

S.No	Animal Name	Scientific Name	Opening Stock as on				Births			Acquisitions			Disposals			Deaths			Closing Stock as on			
			M	F	U	T	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	T
Bird																						
1.																						
2.																						
....																						
Total Birds																						
Mammal																						
1.																						
2.																						
.....																						
Total Mammal																						
Reptile/ Amphibians																						
1.																						
2.																						
.....																						
Total Reptile/ Amphibians																						
Invertebrate																						
1.																						
2.																						
.....																						
Total Invertebrate																						
Total Animals																						

*Animals under Sch- I and II of Wild Life (Protection) Act, 1972

Curator (Animals)

Director

Proforma For Death Report

Part – II

Endangered Species

Death Report for the Quarter/ Year :

S. No.	Animal Name (with individual identification mark, if any)	Scientific Name	Sex	Date of Death	Reason of Death

*Animals under Sch – I and II of Wild Life (Protection) Act, 1972

Veterinary Officer

Director

Proforma for Annual Inventory Report

Part - IB

Inventory Report for the Year :

Other than endangered Species

S.No	Animal Name	Scientific Name	Opening Stock as on 1-4-				Births			Acquisitions			Disposals			Deaths			Closing Stock as on 31-03-			
			M	F	U	T	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	T
Bird																						
1.																						
2.																						
....																						
Total Birds																						
Mammal																						
1.																						
2.																						
....																						
Total Mammal																						
Reptile/ Amphibians																						
1.																						
2.																						
...																						
Total Reptile/ Amphibians																						
Invertebrate																						
1.																						
2.																						
....																						
Total Invertebrate																						
Total Animals																						

Curator (Animals)

Director